LARGEST TELEPHONE CIRCULATION IN THE WORLD.

UNIV. OF MICH
NOV 16 1910
ENGINEERING LIBRARY
622.05
T268

Telephony.

VOLUME IX.
NUMBER 4.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL.

$1.00 PER YEAR.
10 CENTS A COPY.

COPYRIGHTED, 1905.
ALL RIGHTS RESERVED.

CHICAGO, APRIL, 1905.

PUBLICATION OFFICE:
301-306 MANHATTAN BLDG.

THE W. G. NAGEL ELECTRIC COMPANY
MANUFACTURERS
"READY" PAY-OUT REELS
520 ADAMS ST. TELEPHONE SPECIALTIES AND SUPPLIES TOLEDO, O.

The General Engineering Co.
CONSULTING—CONTRACTING ENGINEERS
COMPLETE TELEPHONE PLANTS
139 ADAMS ST. CHICAGO

CHAS. G. STEVENS CO.
BRIGHT COLD ROLLED AND COLD DRAWN
NORWAY IRON, MAGNET STEEL
Cold Drawn Steel Rounds, Flats, Square, Hexagons.
COLD ROLLED STRIP STEEL
LARGE STOCK ALWAYS ON HAND.
58-60 South Canal Street, CHICAGO

JONES & WINTER
INDEPENDENT
Telephone Engineers and Contractors
1259 Monadnock Bldg., CHICAGO, ILL.
WRITE FOR OUR REFERENCES

Nothing Succeeds Like Success
DEARBORN TELEPHONES
are successful because they are the BEST AT ANY PRICE and guaranteed.
OUR NEW TELEPHONE CATALOGUE
tells all about them and also contains a complete line of Telephone Sundries, Construction Material and Tools.
DEARBORN ELECTRIC COMPANY
CHICAGO

CHICAGO TELEPHONES SATISFY

R. W. KEMP
CONSULTING AND CONTRACTING
TELEPHONE ENGINEER
Kansas, Oklahoma and Indian Territory.
Plans and Estimates for Old and New Plants.
Old systems overhauled and placed on paying basis.
WELLINGTON, KANSAS.

New York Insulated Wire Co.
TELEPHONE WIRES AND CABLES
SAN FRANCISCO. BOSTON.
CHICAGO. NEW YORK.

Mathias Klein & Sons
83 W. Van Buren St., Chicago
Manufacturers of
Linemen's Construction Tools
Write to-day for our
"RED BOOK" It is of pertinent interest to every telephone man and will be sent free upon request.

SCOVILL MFG. CO.
210 LAKE STREET, - - - CHICAGO
Sheet Brass of all Tempers
Brass Rod, Wire and Tubing
Special Spring German Silver for Telephone Work
Estimates given on Telephone Parts or Special Articles of Brass, Copper, German Silver or Aluminum

McROY CONDUITS
Brazil, Indiana

Trans-Mississippi Buyers

HEAR! HEAR!

YOU CAN SAVE

TIME FREIGHT MONEY

By patronizing Western jobbers. We have the stock and the facilities for shipping it. A trial is all we ask.

HODGE-WALSH ELECTRICAL ENG'R. CO.

701 Delaware Street KANSAS CITY, MO.

The Indiana Rubber & Insulated Wire Co.

Manufacturers of

Insulated Wires and Cables

JONESBORO, : IND.

SAMUEL G. McMEEN. KEMPSTER B. MILLER.

TELEPHONE ENGINEERS

1442-1443 Monadnock Block,

CHICAGO.

Complete Plants Laid Out. Construction Supervised.

Expert Examination. Advisory Reports.

Alphabetical Index to Advertisers

American Conduit Co. 34
American Creosoting Works.. 98
American Elec. Fuse Co....32-33
American Elec. Telo. Co...27-100
American Electric Works.....100
American Machine Telo. Co... 35
Andrae Sons Co., The Julius.. 34
Austin, M. B. & Co. 12
Automatic Electric Co..... 19

Baird Mfg. Co. 30
Beidler & Co., Francis 95
Belden Mfg. Co. 100
Beltrami Cedar & Land Co.... 89
Benton & Co., Geo. P..... 94
Bissell Co., F. 20
Blake-Signal & Mfg. Co..... 40
Blakeslee Forging Co. 100
Brooks Co., Hall L..... 93
Buyers' Directory 6-7

Cadiz Electric Co. 42
Camp Co., H. B..... 44
Central Electric Co. 22
Central Telo. & Electric Co... 14
Century Telo. & Const. Co.... 17
Chicago Telo. Supply Co....1-3-5
Chicago Writing Machine Co.. 28
Clark Electric Specialty Mfg. Co. 99
Classified Index 6-7
Clement, Edward E. 92-100
Commercial Elec. Supply Co.. 24
Conover & Co., Geo. W.....100
Coolidge Co., M. H..... 90
Crawfordsville Wire & Nail Co. 20
Cook, F. B. 9
Crumb & Co., W. H.....100

Dean Electric Co. 10-11
Dearborn Electric Co. 1
Duluth Log Co. 94

Electric Appliance Co. 4
Electrical Engineering Co....100
Emmelman Bros. Mfg. Co..... 42
Eureka Electric Co. 21
Ewing-Merkle Electric Co. ... 30

Farr Telephone & Construction Supply Co. 40
Fowler, John H. 95

Gemmill Telo. & Mfg. Co. 34
General Engineering Co..... 1
General Insulate & Machine Co. 28
Globe Automatic Telo. Co..... 15

Harvard Electric Co. 44
Hemingray Glass Co. 14
Hipwell Mfg. Co. 8
Hodge-Walsh Elec. Engr. Co. 2
Holt Lumber Co. 91
Houston & Liggett 96
Huebel Co., C. J..... 92
Humbird Lumber Co..... 88

Illinois Electric Co..... 26
Independent Dry Battery Co.. 40
Indiana Rubber & Ins. Wire Co. 2
Indiana Steel & Wire Co..... 18
International Creosoting & Construction Co. 98
International Telephone Manufacturing Co. 100

J. & A. Selective Call Co..... 16
Jones & Winter 1

Kemp, Roy W. 1
Klein & Sons, Mathias 1
Kusel Telephone Mfg. Co., D. A. 18

Lindsley Bros. Co. 88

Machado & Roller 87
Manhattan Electrical Supply Co. 8
Matthews & Bro., W. N..... 93
McDermid Mfg. Co. 12
McMeen & Miller 2
McRoy Clay Works 1
Miller Anchor Co. 87
Minneapolis Cedar & Lumber Co. 94
Monarch Elec. & Wire Co.... 22
Monarch Telephone Mfg. Co.. 13
Moon Mfg. Co. 24
Morrison Lumber Co., J. W.. 96
Mountain State Electric Co... 40
Mueller Company, Wm..... 95
Murdock & Co., W. J.....100

Nagel Elec. Co., W. G.....1-41
Nash & Co., Geo. 18
National Carbon Co. 97
National Telephone Supply Co. 40
National Wire Corporation.... 25
Naugle Tie Co., E. E..... 90
N. Y. Insulated Wire Co..... 1
Nicholas Telephone Selector Co., The 18
North Electric Co. 25
Nungesser Electric Battery Co. 99

Okonite Co., Ltd. 87

Page & Hill Co. 94
Partridge Lumber Co., T. M.. 96
Pendleton & Gilkey 96
Perrizo & Sons 91
Pittsburg & Lake Superior Iron Co. 92
Plume & Atwood 99
Polk, Robert H. 16
Pontiac Engraving Co. 26

Raber & Watson 93
Roebeling & Sons Co., John A. 97
Rogers, Oscar Wentworth 36-37-38-39
Roth Bros. 20
Runzel-Lenz Elec. Mfg. Co.... 16

St. Paul Electric Co. 28
Scoville Mfg. Co. 1
Seaman & Co., W. S..... 12
Sears, Vinton A. 100
Spies Electric Co. 44
Standard Telo. & Electric Co. 23
Standard Underg'd Cable Co.. 44
Stanton, L. W. 100
Sterling Electric Co. 43
Sterling & Son, W. C..... 96
Stevens Co., Charles G..... 1
Stromberg - Carlson Telephone Manufacturing Co. 29
Swedish Am. Telephone Co.... 44

Telephone Books 42-98

Valentine-Clark Co. 97
Veeder Mfg. Co. 99

Wagner Shingle Co., G. N.... 92
Want Advertisements 98
Warner Electric Co. 23
Western Electric Co. 22
Western Telephone Mfg. Co... 31
Weston Elec. Instrument Co.. 87
Whitmore, A. E. 100
Whitney Electrical Instrument Co. 87
Williams-Abbott Elec. Co..... 30
Wittenberg Cedar Co. 95
Worcester Co., C. H..... 89

Yesbera Mfg. Co. 26
Yonkers Specialty Co. 100

Telephony.
AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL
VOL. IX. CHICAGO, APRIL, 1905. No. 4.

Intermediate Distributing Frame

KEMPSTER B. MILLER

THE intermediate distributing frame, if intelligently used, may contribute much to the economic operation of a telephone office; and yet there are those in actual charge of the operation of exchanges who seem to think that its function is purely ornamental, or if at all utilitarian, only in the vaguest sort of way. A story is told of a certain manager of a large branch exchange who appealed to headquarters for more operators. They were sent him, but at the same time a letter was addressed to him suggesting that possibly a judicious use of the intermediate frame might also help him out some. His curiosity was thus aroused, and being of an investigating frame of mind he set to work to see what this intermediate frame was all about and what could be done with it. As a result after several weeks of study, followed by changes in distribution suggested by this study, he not only sent back to headquarters all of the new operators assigned to him, but released also about a quarter of his old force. In speaking of this afterward to a friend, he said, "That thing" (referring to the intermediate frame) "had been there for several years, but neither I nor my predecessors seemed to realize what it was for."

This story happens to illustrate the point in hand very forcibly, and has the further merit (not always possessed by stories which illustrate a moral) of being true. The function of the intermediate distributing frame is entirely separate and distinct from that of the main. The main frame is used to make changes with respect to any connection between an outside line and a line leading to the switchboard; that is, by means of the main frame, any outside line may be connected to any switchboard line considering the switchboard line as a whole, and thus including the line relays, answering jack and lamp, and the multiple jacks. The intermediate frame is used for changing the relations between the answering jack and lamp as one unit, and the multiple jacks bearing a given number as another unit. It is quite obvious that the multiple jacks belonging to any switchboard line must bear the same number as that assigned to the subscriber's line to which it is connected at the main frame. Since it is not an easy matter to change multiple jack numbers it follows that when a change is made at the main distributing frame, the number of the corresponding outside lines must be changed to correspond to the number of the set of multiple jacks to which it is connected. This is not true of the answering jack, for it is feasible to change the number of these, and, moreover, it is not at all necessary that the operator should be informed as to the numbers of the answering jack, or more properly, as to the numbers of the lines with which the respective answering jacks are connected.

The intermediate distributing frame is used for distributing the load among the various operators. Since the load of any operator is determined by the incoming traffic only, and since this is always handled through answering jacks, it follows that in order to distribute the load, changes in the answering jacks appearing before any operator must be made. The load of any subscriber's operator, or A operator, is determined by the number of answering jacks and lamps placed before her, and by the amount of traffic on the lines represented by these answering jacks and lamps. On an average, in modern common battery exchanges, perhaps 120 lines may be handled by an operator; but on account of the great difference between the traffic on different classes of lines it may be necessary to reduce the number of answering jacks and lamps on some positions to twenty or thirty; while on the other hand, other operators, no more skillful, may be able to handle the answering jacks of 300 or 400 of the less busy lines.

In an exchange in a city having from 10,000 to 100,000 population, and provided with a multiple board of the modern common battery relay type, and where there is no trunking and but little message rate or prepayment traffic, an operator's position may handle a daily load of from 1,875 to 1,950 calls. In such work the number of calls handled during the busiest hour would be 216, this depending somewhat, of course, on the length of the business day and on social and business conditions of the town. These figures have been greatly exceeded and a case is on record of 300 calls having been successfully and continuously handled by the various positions in an exchange during the busy hour. This high record was accomplished by gradually increasing the load on the operators by connecting more and more lines with several positions and correspondingly reducing the number of positions.

The argument may be made that the increase in the load on operators will result in bad service and the nervous breakdown of the operators. This is, of course, true if carried to an extreme; but experiments have shown, and have been borne out in actual practical service, that up to certain limits the work of operators may be often increased without in any way detracting from the quality of the service; and that the operators, instead of becoming the victims of nervous prostration, actually prefer the increased load, claiming that being busy always makes their days seem shorter.

So much for the possibilities of the intermediate distributing frame. As already pointed out, it makes no dif-

ference on what position an answering jack is located, so long as it has associated with it the proper line lamp, and so long as the number on the multiple jacks with which it is connected corresponds to that of the line served. By means of the intermediate distributing board, an answering jack and lamp on any position of the board may be made to serve any outside line and its multiple jacks, so that if a certain operator is overloaded some of her lines may be disconnected from her answering jacks and lamps and connected with those of another operator at a new position, or at some old position at which the operator is not over-

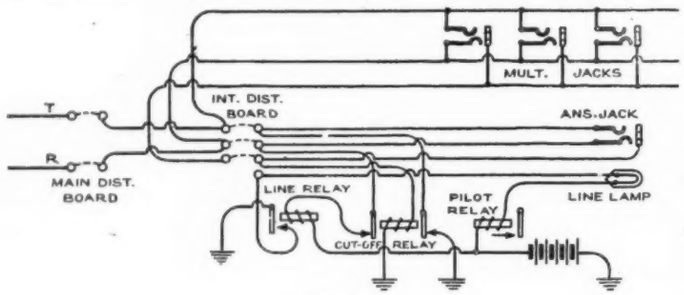


FIG. 1.

worked. Conversely and of more importance, the answering jacks on certain positions, preferably those near that end of the board toward which the future growth of the board will take place, may be disassociated from such position and distributed among the operators' positions on the other portions of the board, thus giving those others more work to do, and dispensing with the services of the operators whose positions are thus left devoid of answering jacks.

The method of making changes at the intermediate frame varies somewhat by reason of the reqirements of the particular line circuit used. From what has been said it will be evident that no changes must ever be made on the intermediate frame which will in any way alter the relation between the multiple jacks and the outside line. Such changes must always be made on the main frame. A change on the intermediate frame will always alter the relation between the answering jack and lamp as one unit, and the multiple and outside line as the other unit. The distinction between the two methods is in the relation which the line and cut-off relays bear to the various other pieces of apparatus belonging to the line. In some systems used by some of the Independent companies, the line and cut-off relays always remain wired to the multiple jacks and to the switchboard terminals on the main frame. In other words, assuming no changes to be made on the main frame, a line and cut-off relay will be permanently associated with a given set of multiple jacks, with a given protector, and with a given outside line.

In the other method, used by most of the Bell companies, if not all of them, the line and cut-off relays remain permanently associated with corresponding answering jacks and lamps, so that whatever changes are made at the intermediate frame, the multiple jacks and arresters remain permanently connected together and to an outside line, while the answering jack, line lamp, and corresponding relays are permanently associated together, and as a unit are changed around with respect to the multiple jacks and corresponding outside line.

To express this in another way, in the method employed by the Bell companies, a given line and cut-off relay always remains connected to a particular answering jack and lamp; and these relays, therefore, always change with relation to the multiple jacks and outside line, whenever a change is made at the intermediate board. The line and cut-off relays are therefore given numbers of their own and do not bear the same numbers as the multiple jacks and subscribers' lines which they serve. In the system used by some Independent companies, on the other hand, a line and cut-off relay remains permanently connected with the multiple jacks, regardless of changes at the intermediate frame, and therefore these relays may always bear the same numbers as the multiple jacks to which they are connected, and consequently the same numbers as the outside lines.

These two conditions are illustrated in the accompanying figures, in which Fig. 1 is the well-known central office line circuit of the Bell companies, and Fig. 2 the corresponding circuit used by many of the large Independent operating companies. These two figures show clearly the part played by the intermediate frame, particularly with respect to the line and cut-off relays.

In Fig. 1 the line will be seen entering at the left and passing through the two sides of the main distributing frame, the jumper wires on this frame being indicated by dotted lines. From the main distributing frame the two sides of the line are continued to two clips on the intermediate frame to which same clips are run, the tip and sleeve sides of the multiple jacks; the test wire on the multiple jacks being run to a third clip on the same side of this frame. All of the connections to the line and cut-off relay, also to the answering jack and lamp, are made to four clips on the opposite side of the intermediate frame, all of these connections being permanent, and allowing no changes therefore in the relation between the answering jack and lamp, and the line and cut-off relays. By means of a three-strand jumper wire, indicated in dotted lines, it will be seen that the connection between any outside line with its multiple jacks and any group comprising an answering jack and lamp and the relays may be altered by changing the connection of the intermediate jumpers.

In Fig. 2 the second method used by the Independent companies is shown, in which it will be seen that the line and cut-off relays are both permanently wired to the multiple jacks and to the arrester side of the main frame. The tip and sleeve side of the circuit leading from the cut-off relays and also from the multiple jacks terminate in two clips on the line side of the intermediate frame, while the lamp circuit extending from one of the contacts of the line relay terminates in the third contact on the same side of the intermediate frame. No change in the relation between the multiple jacks, the arrester, the line and cut-off relay is therefore possible with this form of circuit, all of the wiring between them being permanent and in cables. The opposite side of the distributing frame has three clips for each line, two of these leading to the tip and sleeve strands of the answering jack, the other leading to the line lamp, the oppo-

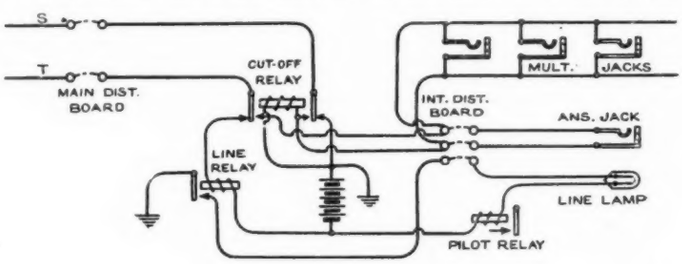


FIG. 2.

site terminal of which is grounded. The answering jack and line lamp may therefore be made to occupy operative relation with any number in the multiple, and thus with any outside line, by merely the three strand jumper wires, on the intermediate frame.

Each of these methods has its advantages. The latter method, by which the answering jack and line lamp alone are affected by changes at the intermediate frame, has the advantage of allowing the numbers of the line and cut-off relays to correspond with those of the multiple jacks, which are permanent. This feature seems to possess practical merit in the greater facility with which cases of trouble

may be handled. Again, when answering jacks and lamps are furnished in excess of the number of lines in the multiple, as is frequently done to afford latitude in the use of the intermediate frame, the addition of a corresponding number of line and cut-off relays is not required since the relays need only be equal in number to the smaller number of multiple jacks.

The point mentioned in the last paragraph of providing more answering jacks and lamps than there are numbers in the multiple has not, I think, received sufficient attention by the Independent people, as it is usually customary to supply only the same number. Ten or twenty per cent more answering jacks and lamps over the total number of multiple jack numbers may be added at trifling expense, and the degree of flexibility allowed thereby in the distribution of the load at the various operators' positions will well warrant the expense.

INCREASING THE REVENUE OF THE RURAL TELEPHONE SYSTEM.

BY E. A. TYLER.

Throughout the entire country one finds evidences of a great transformation. The ways of our predecessors have changed, and the new era of things is as distinct from the old as day is from night. Nowadays one is not content to wait, or to be regaled by the country newspaper with events which happened but a week ago, but an immediate knowledge is required. This great upheaval of custom is due entirely to the use of electricity. Everywhere one sees the magic wires which are gradually transforming the entire states into communities, no longer isolated from one another but into close relationship, as if they all formed part of one big town.

Perhaps the greatest aid to this electrification has been the telephone. People who a few years ago rarely visited the cities and cared little for the general happenings are now in constant touch with the outside world. This has caused an enlightenment and longing for the refinements of modern life; and so the blessings which the mysterious electric current has brought into play are now required.

While visiting a farmhouse recently I inquired of the farmer what he thought of the telephone. His reply was characteristic. "Before we had the telephone put in last year we were afraid of it and of all other electrical things. Now we can't see how we ever did without it, and what is more, we are using a whole lot of things that work by electricity. We have electric lights, electric bells, electric door openers, and I am thinking of putting in a portable motor to run a pump and cut up the feed for the cattle." What a transformation! And all due to the telephone.

This is not an isolated case. There are undoubtedly other instances where the telephone has broken down the barriers of superstition and opened the way for the other uses to which the electric current can be placed. Here, it would seem, are opportunities for the rural and other smaller companies which operate in the territories where electrical applications are not generally known. If a pole line supplies a man with telephone service, why not let it give him light and power? The poles are there and the addition of an electric light circuit will not affect the line if it is properly constructed. A telephone plant, no matter how small, always requires the services of one lineman. When not doing work on the telephone circuits he could be installing electric lights, or perhaps putting in a motor.

The electric bell is perhaps the commonest form of electric appliance, and yet it offers an opportunity to add to the revenue of a telephone plant. Their first installment nets a profit and their maintenance will add more grist to the mill.

On a farm there are many uses to which electricity can be profitably placed—for pumping water both for general purposes and in time of fire, to cut up fodder, to run the cider press, to operate the threshing machine, and where the farm is large enough to run the various agricultural implements. These are simply a few ideas which could apply to all localities in general, but undoubtedly there are many instances where a telephone company could profitably supply power and light for manufacturing purposes.

One topic which is receiving a great deal of attention from the larger companies is the by-products, as it were, of the plants. The investment is large and the returns small. Why? Simply because nine-tenths of the time the circuits are idle or non-productive of revenue. The question then is, What means can be taken to secure the desired returns? and the answer is, Utilize all your idle facilities as far as possible. In the cities this may be a difficult problem to solve, because all the uses to which the investor in a telephone plant turns are already in operation. In the country things are different and all the opportunities are there if they will only be improved.

A dollar saved is a dollar earned, but to save it one must be in a position to have earned it. Therefore, given the opportunity, the telephone company should first see that its system is placed in the best of order so as to allow the by-products to be utilized. Then the dollars saved will accumulate to the joy of the stockholder, and the everlasting gratitude of the patron will be sure to follow.

IOWA INDEPENDENT COMPANIES TO UNITE.

With a capitalization of $1,000,000 the New State Telephone Company was incorporated in Sioux City, Iowa, March 13, for the purpose of handling the Independent toll line business to be operated in connection with the new Sioux City automatic telephone system. The new corporation embraces probably a dozen Independent telephone companies in western Iowa, all of which are anxious to connect with Sioux City, a privilege which heretofore has been denied them by the Iowa Telephone Company, which for years has had a monopoly on the business in Sioux City. The first step will be to build several hundred miles of first-class copper wire lines between Sioux City and the various towns to be connected.

Since the announcement was made that the legal difficulties of the Sioux City Telephone Company had been adjusted and that the people of Sioux City would be talking over the automatic telephones inside of ninety days, the toll line men outside of Sioux City have been busy. They proceeded to organize their corporation. The New State Telephone Company, with headquarters at Jefferson, Iowa, which has fathered the undertaking of putting in the new toll line service in Sioux City, has been in existence for several years, and the new corporation amounts to a reorganization of that company, with representatives of other Independent companies included in the corporation.

Charles G. Cockrill of Jefferson, Iowa, who has been president of the old New State company, is president of the new company; W. H. Leathers of Mapleton is first vice-president; Joseph Mattes of Odebolt is second vice-president; T. B. Lutz of Mapleton is secretary, and M. M. Head of Jefferson, Iowa, is treasurer. These men, with Ira Conger of Cherokee, and J. C. Hammond of Mapleton, are the seven incorporators and the first board of directors.

According to the articles of incorporation, the objects of the company are to construct, own and operate telephone systems and exchanges and rural telephone lines in Iowa, Minnesota, South Dakota, North Dakota, Kansas, Missouri and Illinois, thereby connecting more than 3,000 cities and towns. Of the $1,000,000 capital stock, $500,000 is to be preferred stock and $500,000 common stock. The annual meetings of the stockholders are to be held the third Wednesday in January of each year. The incorporation fee for the new company was $1,015.

Canada and the Independents

The Dominion Telephone Elephant Rages at a Blade of Grass.

THE Independent spirit, as relates to the telephone industry, is rapidly gaining a foothold in Canada, and with its exploitation by men of means and courage, whose sole aim and purpose is the deliverance of the Dominion from the blighting power of the Canadian Bell Telephone Company, there confronts them, like a fire-breathing dragon, the same vicious and malicious opposition that was encountered by the Independent telephone industry in the United States in the earlier stages of the great emancipatory movements here, and which continues to this day in the states to a more or less degree, particularly in those communities where initial Independent operations are imperiling Bell prestige, and where the people are not yet acquainted with Bell methods and its notoriously unfair and underhand mode of dealing with those institutions and men that dare disturb its dream of "natural monopoly" or encroach upon its "sacred rights" of "heaven-granted possession."

For the benefit of our Canadian brethren we will say at the beginning that it takes only the cold light of truth and the educational effect of competition to prove the fallacy of the Bell's claims in any and all instances. For ten years the Independents in Uncle Sam's domain have been fighting this giant corporation that would keep the telephone field to itself in order that it may continue to oppress and rob the people, and manage the great industry in the way best suited to continue the golden harvest it enjoyed uninterruptedly for so many years. The struggle at first was discouraging to the Independents—they were bitterly fought at every stage of the game by a concern with millions behind it, and which resorted to every known trick, subterfuge and questionable method to delay the progress of Independent telephony. But with the right on their side and a mission to perform the Independents have at last overcome the Bell octopus, and clipped off and maimed its tentacles, north, east, south and west—just retribution, and a punishment brought on by greed, avarice, and utter disregard of public sentiment. Another instance of where "The mills of the gods grind slowly, but they grind exceeding fine."

What, as a result, is the situation in the United States to-day? The Independents have grown at a most amazing rate, until now there are *two Independent telephones to one of the Bell in this country,* there being more than 4,000,000 of the former in use to less than 2,000,000 of the latter, and the increase of Independent companies continues in an ever-growing ratio. As far as the United States is concerned the Bell dragon has met its St. George, and the impression obtains far and wide that the would-be monopoly will have its hands full in the future to maintain even its present uncertain standing in the telephone field.

Inspired by the progress of the Independent movement in the United States Canadian Independent telephone men have instituted a forward movement in that country, and are determined to secure a full share of the telephone patronage throughout the Dominion, and, by introducing an element of competition into the situation, to give the people the best service to be obtained through the employment of modern apparatus, up-to-date equipment, and those methods that shall make for the maximum of satisfactory service at reasonable prices—something it has absolutely been impossible to obtain in Canada under the Bell regime.

One of the worst features in the way of opposition that the Canadian Independents are meeting with is the pro-Bell attitude of certain more or less influential papers in the provinces. It is not for us to say that these papers which are opposing the Independents—and therefore the best interests of the communities in which they are published—are subsidized, but from a knowledge of Bell methods in this country, as applied to the purchasable press, and an acquaintance with Bell literature, we should say that there are a few Canadian papers, at least, that need to be vacinnated. If they would take the pains to familiarize themselves ever so little with the Independent situation in the United States, and could be brought to appreciate the untold benefits that the telephone-using public of this country is enjoying because of the Independent movement, it would seem that they could not consistently maintain their present unprogressive attitude of opposing Independent sentiment in Canada.

As a fair example of the opposition which is being encountered by the anti-Bell interests in the Dominion it is only necessary to cite the situation in the town of Peterborough, Ontario, where the Canadian Machine Telephone Company is installing an automatic system, as opposed to the Canadian Bell. Peterborough has a population of 14,000, and is the first town where this company has secured a franchise and undertaken to do business. A first-class system is being installed, and as a result, a large amount of attention throughout Canada is being attracted to the town by reason of its granting a franchise to the Independent company. The result, therefore, is being watched closely, and the Independent movement in Canada will be greatly influenced by the outcome of the fight in Peterborough. Consequently the Bell is leaving no stone unturned to place obstacles in the path of the men at the head of the Peterborough enterprise, and all the mischievous, underhand methods that in the past have been employed in this country are being used in the Canadian town. Threadbare, exploded arguments that have become the laughing-stock of millions of Americans are being advanced over there as the simon-pure article. Innuendo and slander are being resorted to, and in this beautiful Bell campaign at least one Peterborough paper is lending its aid to block the wheels of telephonic progress. The most charitable view to take of the attitude of its editors is that "they know not what they do."

The following editorial from the paper above referred to "rings true," according to the Bell idea—the antiquated, unprogressive and monopolistic idea—but to the Independents of this country and Canada, who know from observation and experience, "the truth, and the whole truth," of the matter, it is simply amusing—that is, it would be amusing if it were not so viciously false and puerile:

Now is the appointed hour, and a most appropriate and opportune time, in which to call the serious attention of our readers to the proposed futile attempts to enrich a few adventurers who would apply the thumbscrews of legalized blackmail to one of the greatest and most satisfactorily managed public necessities of our generation. Monopoly and centralization of the natural resources and products that Providence has manifestly given for the general good of mankind is quite justly and, in all common sense, universally bringing censure on the heads of the Standard Oil, the beef, tobacco, metals, cottons, woolen, transit and all similar monopolistic corporations; but this is a vast corporation which spreads its helping arms far and wide over the Dominion, not with a view or intention to squeeze out competition, but from the manifest necessities of the case, in the interests of the public quite equally with their own.

A few of our fellow-townsmen a few years ago antagonized the local branch of the Bell Telephone company, by the mal-judgment of a popular but indiscreet and over-zealous agent, tried the experiment of introducing a local opposition to the already well-organized Bell service. The result is still fresh in the minds

of those hot-heads who, relying on their experience and on the specious promises of the promoters, launched this puny local concern. What was the result? Just what happened to such other companies (including the Federal Company of Montreal) as would happen to a man who might attempt to satisfy the appetite of an elephant with a blade of grass!

With the limited capital that such local companies can command, unable within any definite or specified time to even make reliable promises of outside connection with other towns and cities, they stagger along, unable to sustain the financial burdens that the ever-increasing expenses impose, paralyzed by the unforeseen, unprovided for but inevitable misfortunes that befall them as a result of storm, ice, fire or underground disturbances from causes too many to enumerate, until the bubble of their extravagant expectations bursts, and it becomes a choice between absolute bankruptcy or going, hat in hand, to the company that at a fair living price had given a better local (not to mention outside) service than they had, and selling out at the Bell company's own terms. With our quondam opposition in Peterborough we remember the confusion that arose, the never-ending trouble that both merchants and householders experienced, the hard-worked girls who wasted months learning a business that, on failure of their local employment, excepting the few for whom the Bell company kindly found places, was of no further use to them; the hard-earned dollars subscribed by deluded citizens in ever increasing jeopardy, and more than all, the feeling of relief pervading the town when the old established Bell company had the field to themselves again.

In the general cry against monopolies lies more or less justification in every dissenting voice, but to hurl the epithet "monopoly" against the one and only telephone company in successful operation is like men living in glass houses; the stone will smash the glass in its flight, but, in the former parallel case, the rebound must injure not so much the Bell telephone, as the public themselves, who are the real gainers by preserving what can only be of use to them as a monopoly. Both common sense and that most convincing argument of all, experience, tells, and has most emphatically demonstrated, that local opposition to the Bell Telephone Company, with all its concurrent disturbance of business, and final withdrawal from business, has had no other result than failure, and seldom any foundation but a scheme to ultimately sell out to or blackmail a company against which the public has no substantial grievance.

Business and actual present facts teach the Bell company, and sad experience has taught local companies that, as the exchanges increase their subscribers, working expenses increase in a much faster ratio than the number of telephones in use; and local companies that have gone, and must go, to the wall know that the public only pays, in Canada at least, a fair price for a first-class service. For incipient, half-hearted local companies to dangle the bait of promises that surrounding towns will follow suit and ultimately be joined by wire is to obtain cash under false pretenses, as they cannot foresee the local jealousies and a thousand difficulties that are almost certain to arise before their promised link to link exchange idea can be consummated.

TELEPHONY feels almost like begging the pardon of its readers for publishing this atrabilious outpouring against a cause and a company which, if given the aid in Canada they so richly deserve, are certain to raise that splendid country out of the telephonic slough of despond into which it has fallen, set its feet on solid ground, and bring it emancipation from Bell slavery. To fight Independent progress in Canada can be likened only to benighted heathen warring against the advance of civilization into their unblazed domain. The attack made on the Peterborough telephone crusaders by the paper just quoted evidently was inspired by the Bell company or its agents in Peterborough. It shows that already the Bell and its adherents in that city are wincing with all the activity and semblance of the proverbial "galled jade." Such tactics invariably fail of their purpose—they always have and they always will.

"Whom the gods would destroy they first make mad" is an adage that applies with particular force to the Bell company in its dealings with the Independents. In the United States the Bell has lost a thousand battles, and largely because of employing tactics that showed it to be "mad clear through." And history will repeat itself in Peterborough and Canada.

The tirade in the Bell's Peterborough organ hardly deserves a reply, and surely can carry no serious weight with the intelligent, fairminded people of that community, who believe, with our strenuous President, in "a square deal for every man." The conditions in Canada are identical with those that obtained in the states several years ago, and to call Independent telephone promoters "adventurers" and Independent telephony "legalized blackmail," because a few companies organized in opposition to the Bell have been forced to sell out to that company, stamps the writer as a man wholly ignorant of the true situation, and painfully unfamiliar with the true facts regarding Independent telephony. Perhaps it might interest him, for instance, to know that there are at the present time more than 10,000 Independent telephone companies in successful operation in the United States, representing an investment of nearly $300,000,000. Will the Peterborough journalist please explain the why and wherefore of this—even taking the Bell point of view?

The enterprise now under way in Peterborough is no more the work of "adventurers" or in the nature of a "legalized blackmailing" scheme that can be charged to any other legitimate business in that town, but that's the refined, ladylike way the Bell company and its marionettes have of referring to Independent undertakings. The animus of such abuse is well understood and has little effect with right-thinking people. It will fail of its purpose in Peterborough, and as sure as fate will act as a boomerang on those who are using this form of "argument."

And imagine *if you can*, dear reader, the Bell company as "a vast corporation which spreads its *helping arms* far and wide over the Dominion, *not with a view or intention to squeeze out competition.*" *Can you conceive such a thing in your wildest imagination?* Isn't such a statement positively funny—the very essence of humor? We believe you will agree with us that it is. And as for the Bell's "helping arms," there can be but one opinion—it certainly has any number of "helping arms," and its main forte always has been, and is, to spread those "arms" over everything telephonic in sight, "helping" itself to franchises, streets, newspapers (more's the pity), and everything else that isn't nailed down. This is the game that the Independents so beautifully checked in the United States. Yes, the Bell is strong, very strong on the "helping arms" question. What Canada wants to do—and Peterborough in particular at this time—is to checkmate the Bell and try a little of the "helping arms" business itself. And as for the Bell not attempting to squeeze out competition—simply conducting business in Canada from a humanitarian standpoint—was anything ever uttered more absurd? What is the Bell doing in Peterborough right now but straining every nerve to squeeze out competition? There is such a thing as consistency, but this rare jewel evidently has no place either with the Bell or its Peterborough mouthpiece.

The reference made to the former opposition in Peterborough is to a local company which was formed there some years ago, and which, after operating for about three years, was bought out by the Bell company. The local company at that time had poor construction, was charging very low prices and no doubt would have continued in existence if the management had been satisfactory.

When the Independent movement was launched in the United States a great deal was heard from the Bell camp about the folly of "feeding an elephant with a blade of grass." Of late, for some reason, this argument is never heard in this country. To hear it now from Canada seems like discovering a long-lost acquaintance. In the states, it will be observed, the "elephant" that looked askance at the Independent "blade of grass" ten years ago, is now having his appetite gloriously satisfied as to "grass," and this "grass" is mostly gathered from the Independent field. Canada will be experiencing the same condition in a few years. Its "blade of grass" will multiply a thousandfold.

As for the general attack of the Peterborough paper against the Independent telephone men of that town, and their commendable undertaking—it is really unworthy of notice further than to state that it is no more than could

be expected of a Bell organ, and should be taken by the people of that city with a large grain of salt. One usually doesn't expect a thistle to bear figs.

And in years to come, when Peterborough's citizens are enjoying all the advantages of a first-class Independent telephone exchange, they will recall the "elephant and blade of grass" article with not a little amusement, and will thank heaven for the institution that delivered them from the grasp of a back-number, grasping, contumacious and truth-shunning monopoly.

Coming nearer home for the Peterborough people and striking at the very root of the whole subject we herewith reproduce an article which appeared in a recent number of The Canadian Engineer, under the caption, "Telephone Competition vs. Telephone Monopoly":

It is frequently asserted by the opponents of Independent telephony that the telephone business is a natural monopoly, and that it is not in the public interest to introduce competition into this class of service. How far this statement is corroborated by facts is shown by the marvelous results achieved in the United States within the past eight years, and also in Great Britain within a much shorter period. In the beginning of 1896 the Bell and its subsidiary companies, as a result of over twenty years' undisputed possession of the field, had less than 600,000 telephones in use in the United States, whereas to-day the Independent companies have over 7,000 exchanges with 2,500,000 telephones, representing an investment of $200,000,000. Further than this, seventy-five per cent of the cities having a population of over 20,000 inhabitants are installed with a telephone system in competition with the Bell. We need only enumerate such centers as Chicago, Cleveland, Philadelphia, Detroit, Pittsburg, Baltimore, St. Louis, Buffalo, Minneapolis and St. Paul; Portland, Maine; Louisville, Kentucky; Los Angeles, California; Salt Lake City, Utah; and Seattle, Washington, to show that the most important cities in all parts of the United States appreciate the value and importance of telephone competition.

In Great Britain the growth of telephone competition has been limited by the fact that the postoffice department, which controls this business, will permit only municipalities to establish competitive services, and then only after an exhaustive and expensive government inquiry has been held, in which a formidable array of legal talent and expert evidence in opposition has to be surmounted. This procedure cannot be said to encourage municipalities in their desire to obtain relief from the monopoly, but notwithstanding this, competitive systems have been established in Glasgow, Portsmouth, Brighton, Swansea, Hull and in the islands of Guernsey. In each of these places the results have exceeded the anticipations of the most enthusiastic supporters. Manchester, Salford and Stockport also are arranging for a joint municipal service, and other systems contemplated are Scarborough, Cambridge, Belfast, Oldham, Burnley, Aberdeen and Barrow-in-Furness.

In order to throw some light upon the financial side of telephone competition we publish herewith some statistics showing results of the working of telephone monopolies in Great Britain and Canada, in comparison with those of competitive undertakings. These figures prove conclusively what it is possible for a company or municipality having a system that is well managed and legitimately capitalized to accomplish, as compared with a monopoly whose capital includes much watered stock, and whose obsolete plant is replaced at the expense of telephone users instead of being charged against the profits of the undertaking.

It will also be noticed that on both sides of the Atlantic the comparisons between the monopoly and its competitor show almost identical results, the slight difference being in favor of the two United States Independent companies quoted. This is due to the fact that there are more subscribers within the same area in American cities than in Great Britain. Another very significant fact is that the average capital per station of the monopoly (and especially is this the case in Canada) includes a large proportion of obsolete plant and single grounded lines; whereas the competitive systems are all modern plants comprising long-distance telephones, copper metallic circuits, and a large percentage of underground wires.

The figures for the United States and Canada include the long-distance lines, which in Great Britain are owned by the State; therefore, some allowance must be made in this respect, but it will be seen from the mileage of long-distance wire per telephone that, if the figures could be accurately dissected, it would not make the Bell compare more favorably with the Independent results. In the case of the revenue per telephone, with the Bell long-distance line earnings eliminated, the exchange receipts still average $1.56 more per subscriber than those of the "National" company in Great Britain, although, in consequence of the greater cost of construction in the large English cities, the latter has a very much higher capitalization per station. The proportion of watered stock in the British and Canadian monopolies is, however, about equal. The difference between the revenue per station of the monopolistic companies and that of their competitors is also strong evidence of the fact that telephone users are paying too much for their service.

FINANCE STATISTICS COMPILED FROM THE LATEST BALANCE SHEETS ISSUED BY THE UNDERNOTED TELEPHONE UNDERTAKINGS IN GREAT BRITAIN, CANADA AND THE UNITED STATES.

	National Tel. Co. (England)	Bell Tel. Co. of Canada	Glasgow, Scotland (Municipal)	Portsmouth, England (Municipal)	Guernsey, Channel Isles (State)	Inter-State Tel. Co. Illinois	Citizens' Tel. Co., Grand Rapids Mich.
Total capital expenditure	$50,681,963.00	$8,000,000.00	$1,562,208.00	$155,329.00	$144,854.00	$969,915.00	$1,609,280.00
Average capital per station	$168.50	$139.93	$137.00	$93.62	$94.34	$96.99	$98.20
Revenue	$9,413,477.00	$1,877,605.00	$241,742.00	$29,137.00	$19,792.00	$150,410.00	$343,392.00
Revenue per station	$31.28	† $32.84	$21.19	$17.55	$16.22	$15.04	$20 95
Annual expenditure, including interest and dividends	$6,921,099.00	*$2,407,634.00	$224,020.00	$23,215.00	$18,813.00	$114,971.00	$211,279.00
Annual expenditure per station	$23 01	‡ $42.11	$19.63	$13.00	$15.45	‡ $11.50	‡ $12.89
Interest and dividends	4.29% (average on bonds & stock)	5% on bonds 8% on stock	3.20% on bonds	3% on bonds	3% on bonds	5% on bonds 4% on stock	8% on stock
Set aside for Sinking Fund, depreciation, etc	1.52%	3.28%	4.67%	6.06%	5%	3.66%	3.1%
Percentage of annual expenditure to revenue	73.54	95.45	92.66	79.67	95.05	76.43	61.53
Percentage of revenue to capital expenditure	18.57	31.52	15.47	18.57	17.23	15.52	21.34
Number of telephones	300,775	57,172	11,405	1,659	1,217	10,000	16,388 (5,605 in Grand Rapids)
Miles of long-distance poles	Nil	7,685	Nil	Nil	Nil	7.97	1,116
Miles of long-distance wire	Nil	30,967	Nil	Nil	Nil	2,215	2,453
Miles of long-distance wire per telephone	Nil	0.54	Nil	Nil	Nil	0.22	0.15
Business rates:							
In cities—London	$82.79						
In cities	$48.70	$30 to $50	$25.57	$24.35	$24.35	$30 to $40	$30 to $36
In small towns	$41.40	$15 to $25				$15 to $24	$12 to $24
Residence rates:							
In cities	As above	$20 to $30	As above	As above	As above	$18 to $24	$18 to $24
In small towns	As above	$15 to $25				$12 to $18	$9 to $18

Note.—The "Bell" rates in small towns cover, in most cases, a distance of only half a mile of single grounded line, and do not include long-distance telephones.
* Including long-distance receipts.....$2,522,275. † Including long-distance receipts..... .. ..$44.12
‡ Includes expenditure on long-distance lines.

As regards the situation in Canada, what has been accomplished in Great Britain and the United States should be achieved with equal success here, and *our object in presenting these facts is to show how groundless are the assertions that telephone competition is not successful; and also to give encouragement to those who are endeavoring to obtain for the people a better and cheaper service by the introduction of municipal or Independent systems.* As we have stated before, while we are glad to notice the agitation in favor of government ownership of the long-distance lines, we are convinced that this can only be made possible by weakening the grasp of the present monopoly by the creation of a number of local competitive systems to an extent which will compel the government to recognize the necessity of providing means of intercommunication which no company or individual can limit or control.

There is a great future for competitive telephony in this country if those responsible for the provision of public utilities will unite in one common effort to meet the needs of the people, by the provision of local systems either by the adoption of municipal ownership or the granting of franchises, with reasonable safeguards, to responsible companies. So far as the public is concerned it is not so much a question of municipal telephones as of the securing a cheaper and better service; therefore, every means toward that end should receive the unswerving support of our local authorities.

DIGEST OF TELEPHONE LITERATURE

Conducted by Samuel G. McMeen.

Bankers Buying Independent Securities—CLENDENNIN.—*Telephony, March.*

FINANCE AND ECONOMICS.

Continuing a subject introduced in the February number of the same journal, in which the earnings and profits of Independent telephone enterprises were discussed. Several large purchases of Independent telephone securities by banks, and by bankers for private investment account, are specifically mentioned. A long list of dividend reports is quoted and the conclusion is drawn that Independent securities do pay dividends and not a few of them greater dividends than "the trust" or its constituent companies ever paid. Statements in considerable detail are given from the annual reports of the Home Telephone and Telegraph Company of Los Angeles, California, and of the Home Telephone Company of Elkhart county, Elkhart, Indiana, as typical.

Independent Possibilities in the Far West—KUSEL.—*Telephony, March.*

A brief exposition of the opportunities for Independent telephone activity in the Rocky Mountain and Pacific Coast states.

Telephone History of New York City—Telephone Magazine, March.

Reprint of an article originally appearing in the New York Herald. An article well worth reading by anyone interested in the New York situation; its principal feature is the review of the rise and fall of the Telephone, Telegraph and Cable Company of America.

For Telephone Merger—Electrical World and Engineer, March 11.

The introduction of a bill in the New Jersey legislature recently is thought to be a preliminary step toward the big national telephone merger which appears in newspaper columns from time to time.

Telephones in Spain—Finance, March 11.

A condensed resume of statistics of the telegraph and telephone businesses in Spain during 1904.

What Electricians Are Earning—Electricity, March 15.

An editorial presenting comparative earnings from electrical enterprises, in which electric railways are placed highest, electric manufacturing interests next, electric light companies third, telephone companies fourth and telegraph companies fifth.

Lincoln, Nebraska, Expected Earnings—Finance, March 4.

A short description of the new automatic plant at Lincoln, Nebraska, followed by a discussion of the financial features.

Telephonic Development in Canada—Electrical World and Engineer, March 11.

The statement issued at the twenty-fifth annual meeting of the Bell Telephone Company of Canada reads glowingly of the past, present and future of that company. Mr. Sise has stated that the Bell Telephone Company of Canada has not suffered appreciably from competition; that there are many small concerns in the business and that none of them are paying dividends. At present, some thirty municipalities in Canada have given the Bell exclusive rights.

Advantages of Competition—American Telephone Journal, March 11.

A comparison of English, Canadian and American companies, Bell and Independent, with table of comparative statistics.

Independent Telephone Movement—WARE.—*Finance, March 18.*

A review of the present condition of the Independent movement in different sections of our country. The United States is taken up practically state by state and city by city and reviewed, in many of the instances a comparison with the Bell being mentioned.

Investigation in New York City—Electrical World and Engineer, March 18.

The Merchants' Association of New York City has issued a statement as to an examination of the investment, equipment and operating accounts and the gross and net earnings of the New York (Bell) Telephone Company.

Why Bell Rates Are High—American Telephone Journal, March 18.

Six logical reasons: High depreciation, high capitalization, high cost, high maintenance, royalties, and lack of interest on the part of employes.

Des Moines, Iowa, System—Western Telephone Journal, March.

EQUIPMENT.

An illustrated description of the new plant of the Mutual Telephone Company of that place. The central office equipment consists of a lamp signal bridging switchboard with an ultimate capacity of 9,600 lines and a present equipment of some 2,630 lines, of which 2,000 are individual and 630 four-party selective. The outside plant is practically all-cable, and a large proportion is underground. Prior to rebuilding, the Mutual company secured a revision of rates from the Des Moines city council, the terms of which are set forth.

Egg Harbor City, N. J.—American Telephone Journal, February 25.

History of the Independent development at that point.

Riverside, California—HIGGINS.—*American Telephone Journal, March 11.*

An illustrated description of a Strowger automatic plant just installed at that place with a present capacity of 1,000 lines, to which 500 lines must be added at once to fill waiting orders.

The Telephone—TAYLOR.—*Sound Waves, March.*

An installment. To handle a small toll line business it is necessary to install various special auxiliary devices in the regular exchange switchboard upon which the toll line may terminate. To avoid tying up a whole toll line passing through a switchboard when it is desired to use it one way only, the toll line drop is placed on a bridging jack and a cut-off jack placed on each side, so that when the toll line is taken one way the drop remains on the extension running in the other direction from the exchange. When party lines are operated in an exchange, special switchboard arrangements are necessary if selective signals are used; it is common to make these switches common to all the cords of the operator's position, the operator selecting the proper selective ringing key and operating it at the same time that she operates the ringing key of the cord to be rung upon.

Independent Development in New York, New Jersey, Pennsylvania and Indiana—Western Electrician, March 11.

A brief statement of data of telephones and mileage in those states, with maps of the toll line development. The greater part of the story is told by the maps, which show a seemingly thorough development in short interconnecting toll lines.

Modern Telephony—RADCLIFFE.—*Telephone Magazine, March.*

The second installment of this series. This installment has to do entirely with transmitters and the now usually attendant induction coil. At first attempts were made to devise transmitters speaking with greater distinctness than the granular carbon, but all such types of instrument have practically been abandoned.

Success of the Street Pay-Station—HOPWOOD.—*American Telephone Journal, February 25.*

Public street telephones, first tried in Bridgeport, Connecticut, have been tried in Cleveland and have proved a success. In every city there are stretches of streets, as

residence streets, where public pay stations of the usual nature are impracticable. A telephone mounted in a water tight box on a suitable post, designed as a whole for installation on the curb, fills all requirements, and has proven satisfactory in service and financially remunerative.

The Automatic Telephone Switch—BRADBURY & CAMPBELL.—*Sound Waves, March.*

For a thorough understanding of automatic telephone circuits it is not only necessary to be able to trace the circuits, but also to understand the movements of the various parts of the mechanism that follow each of the electrical impulses. Proceeding on this assumption, the writers seemingly assume a system out of chaos and proceed to describe it. The first selector and second selector are shown without side switches, while otherwise the system seems to have much of the Strowger elements and functions.

Line Testing—NEWTON.—*Sound Waves, March.*

In order that any telephone company may furnish first-class service, continuously and reliably, it is necessary that its offices should be provided with proper equipment for testing and locating trouble, and especially is this necessary on trunk lines or toll lines, which are used by the whole exchange, and on cables where a single fault may affect many subscribers. With proper testing equipment, troubles in cables often can be discovered early enough to prevent any serious interruption to the service. For ordinary testing a galvanometer and Wheatstone bridge are required to locate the fault upon the conductor, while the mere finding of faulty conductors may be done by systematic and periodic tests with a battery and an ordinary telegraph relay and sounder. Bridge and loop tests are described with such detail as to enable one engaged in telephone work to gain a considerable facility in testing and fault location.

Brooklyn Rapid Transit—DEANE.—*Telegraph Age, March 16.*

A description of the telegraph and telephone plant of that street railway system. The telephone service of the company is extensive, its private lines being owned outright.

Sustaining Pole on Rock—American Telephone Journal, March 4.

An illustrated description of a method of setting a pole on rock without blasting or piling stones. The economy should be calculated, including the item of saving by utilizing a shorter pole, as no part of the pole is placed under the surface.

Telephone Line Engineering—WOODBURY.—*Telephony, March.*

LINES AND LINE CONSTRUCTION.

Conductors not having supervision should be as permanent as possible to give constant service. The amount of capital invested in outside plants shows the importance of the subject, and the rapid depreciation of most of this property indicates the necessity of selecting the proper methods of construction. Forty-five per cent of telephone wires are on poles, but the proportion of pole line to conduits is much greater. Typical methods of setting poles are described. Wood poles are generally used in this country, as conditions requiring iron poles are not frequently met. In crossing marshes special methods of setting poles are required, the methods adopted in several instances being given in some detail. In sandy soils, poles may be set securely by the water jet method. Ice loads and synchronism of vibration are elements which sometimes wreck pole lines and which should be considered in pole line design. Care should be exercised in crossing a high-tension line, to prevent accidental contact in the event of broken wires, either telephone or high-tension. The tension and liability to breakage of open wire increases as the sag is pulled up; wires should be drawn tight enough to prevent them from swaying against each other, yet the tightening by shrinkage in cold weather should not increase the strain to the breaking point. A table of spans, sags and temperatures is given for hard drawn copper wire. Where some feature of the right-of-way requires an exceptionally long span, special methods are required; a large number of instances are cited. Underground conduits are made necessary by the large number of wires in cities, and in connection with multiple-conductor cables have facilitated the distribution of masses of telephone circuits required in city exchanges.

Anti-Humes—Sound Waves, March.

A sensible discussion of home-made methods of avoiding this disagreeable feature sometimes present in open-wire construction.

Telephone Lines—O'BRIEN.—*American Electrician, March.*

The dividing point between the inside and outside lines occurs at the arresters; outgoing lines are led from the arresters by cables, varying from fifty to four hundred pairs of wires. In the office manhole the cables from the office are spliced to other cables leading toward the substations. The terminal pole block system is now largely used in cities. The territory served is divided into blocks and a terminal pole located as near the center of each block as possible. A lateral cable then is taken from the main conduit line to a terminal box on this pole, whence drops are run to the subscribers' premises. The substation wiring may require connection of a protector and of extension bells or extension telephone sets as well as the main terminal instrument. Circuit diagrams are given, but in the space of a short article this broad subject cannot be well covered.

Telephone Construction Practice—MINHINNICK.—*Telephony, March.*

The second installment of a serial. The gravest fault of many telephone plants in earlier days was that they were not built by engineers. The steps of engineering of the outside plant construction are taken up in order; making the map, spotting on the proposed substations, laying out the distribution, etc. The necessity of field notes and care in the making of them is emphasized, and reproductions of pages of field notes and records of the progress of work are given.

Line Construction in Abyssinia—Electrical World and Engineer, March 4.

Brief mention of troubles peculiar to that country. In wet districts the land becomes so boggy that the poles fall down; in dry districts the wooden poles are devoured by insects; iron poles are carried off by the native population. The telephone lines are policed and patroled constantly.

Insect Threatens Lead—Covered Cables—DWIGHT.—*Telephone Magazine, March.*

Enormous damage is said to be resulting in Texas from work of a bug which bores into the lead sheath of cables. Hundreds of miles of cables are reported as damaged, and thousands of dollars will be required for repairs. The bug seemingly has not been active outside of Texas. Damage is reported also to cables in Japan, which are enclosed in bamboo poles. A Shanghai, China, telephone company reports much damage to lead-covered cables by a wasp which bores through the sheath to lay eggs; this damage was noted only near bamboo groves, and the cables at those points were covered with hemp, through which the wasps did not attack the cable. John Hesketh is quoted for authority for damage by beetles as early as 1896, in Australia. The Texas holes are reported as being "as large as a small bean," while those in China were so large that at first it was thought that they were bullet holes.

Rural Line Construction—PRICE.—*American Telephone Journal, March 18.*

Third article of the series. This portion of the series deals with cross-arms, setting and bracing; guying; making river crossings; running wires.

Electrical Thawing of Underground Laterals—KIRTON.—*American Telephone Journal, March 4.*

Water collects in lateral conduits and by freezing compresses the cable and causes reduction of insulation between conductors, if not actual crosses. When the lateral is enclosed in an iron pipe as conduit, such cases of trouble may be removed by warming the conduit by a current through it. A portable transformer and its connections and control are described, the plan being to tap a power circuit for current.

ondon Telephone Monopoly—Electricity, March 8.

Under this caption is discussed editorially the causes which have led up to the recent agreement between the National Telephone Company of England and the postmaster-general. As with the American Bell, the National got control in the earlier days by buying up the small companies; the monopoly was offensive to the patrons not so much through high rates as through inferior service due to antiquated apparatus. The postmaster-general has from time to time taken steps to ameliorate the condition of telephone service, and various municipal telephone companies have been organized and operated, but seemingly without the desired result up to this date. An agreement now has been reached.

OPERATING.

England to Own Telephone System—Telephony, March.

Agreement has been reached between the postmaster-general and the National Telephone Company by which the English telephone system will pass to government ownership on December 31, 1911. The trunk lines, or toll lines, are already in charge of the postoffice department, and the arrangement just consummated will pass the local exchanges into the same management.

Switchboard Operating Suggestions—WEIRICH.—*American Telephone Journal, March 18.*

In Monroe, Wisconsin, the operators are systematically tested for their rapidity in answering calls, and are rewarded for good records by being granted "time off," the bonus time varying from two hours up to half a day every two weeks.

Rural Telephone Line Building—LEE.—*Sound Waves, March.*

The need for the telephone seems greater in the case of the farmer than in the case of his city neighbors, because of his more isolated position. Rural districts are eager for the new means of communication; a rural system is soon connected with other systems, and then with the nearby cities, until the entire country will soon be a network. Plans of organization, methods of construction and costs of operation for Ohio are given. By installing the switchboard in a private house, service may be obtained both day and night at a nominal cost to the users.

Telephone By-Products—American Telephone Journal, February 25.

The average subscriber's line is used probably not more than ten minutes a day. On long-distance lines, the percentage of idle time is very much smaller. The Bell Telephone Company is deriving revenue from the use of its long-distance lines for telegraph purposes, estimated at several million dollars each year. As yet, the Independents have not been harvesting profits from by-products, and this seems one of the fields to be developed for additional profits after demands for ordinary telephone service have ceased to increase so rapidly.

Clearing House Progress—VIVIAN.—*Western Telephone Journal, March.*

The clearing house department of the Michigan Independent Telephone Traffic Association began work in its offices in Grand Rapids a little over eight months ago, "to promote and regulate interchanged telephone service between the different Independent telephone companies of the state of Michigan and other states." Contains a general report of work done to date, with a recital of difficulties encountered and methods adopted. The cost of auditing 125,000 messages has been about two and one-half cents per message; a lower rate is anticipated for the ensuing year.

st Office Telephones—Electrical World and Engineer, March 4.

Under the conditions of a ruling of the United States postoffice, postal employes are prohibited from answering inquiries concerning mail when made by telephone. This rule is based on an assumed inability of the employe to identify the calling party over the telephone, and this lack of identification in connection with the previously existing rule that mail matter or information concerning it may not be delivered to any but the person addressed or his authorized agent prevents any information being given over the telephone.

Married by Telephone—Telephone Magazine, March.

This instance is one in which the license was procured by telephone, and the marriage ceremony proceeded without the bona fide presence of the legal authorization other than as mentioned. The legality of the ceremony is not discussed.

The Situation in Connecticut—REYNOLDS.—*Telephony, March.*

A recital of the Bell history for the state of Connecticut, with mention of the small progress made by Independents in that state. An article of rather caustic comment on Bell methods as pursued in Connecticut in particular, and on the results to the telephone using public when Independent telephone competition is suppressed.

The Cincinnati Telephone Decision—Telephony, March.

The decision recently delivered by the courts will have the effect of withholding Independent construction in Cincinnati for the present, but the promoters of the Independent movement assert their intention to have a plant in that town eventually.

Telephonic Conditions in France—Telephony, March.

Dissatisfaction with the conditions of telephony in France under government management has resulted in the organization of an association of telephone subscribers. The history, purposes and results to date are reviewed briefly.

Bell vs. Independent Long-Distance—Telephone Magazine, March.

An editorial opinion on the wisdom or otherwise of contracts between Independent telephone companies and the Bell telephone company in the matter of co-operation in handling long-distance business.

Japanese Signal Service—SULLIVAN.—*Technical World, April.*

War to-day is less a question of men than of machinery, and of all the mechanical equipments pertaining to an army, the signal corps stands among the most important. In the development of the Japanese signal corps, the United States system was adopted practically in its entirety, yet have developed it and improved upon it. The signal corps is recruited from men who have had to do with the work of handling appliances of similar nature in times of peace, the efficiency secured in the army is very high. It is important that the commander shall have information concerning every division of his army, no matter how far separated, and that he shall be able to send instructions for action instantly and reliably. This is not a simple problem when the endless and seemingly erratic movements sometimes required are considered. The Japanese are adepts at all methods of signaling, but have found that for communication within their own lines the telephone is most valuable. Under the Japanese system, no part of the army is ever isolated for long. Hastily constructed telephone lines keep the commander constantly advised and enable him to direct his troops with remarkable facility and exactness. Wherever a camp is established, even though it be but a few hours, a temporary telephone exchange with switchboard is established. This exchange is connected with the main headquarter's exchange, and thence with a shore station, all of the shore stations having cable or wireless telegraph connection with the Mikado and ministers in Tokio. Almost every Japanese scouting party sent out is accompanied by a telephone detachment which unreels its lines as it advances and keeps constantly in touch with the body of troops in the rear and reports minutely all observations made. The advantages of this over the old method of sending messengers back with dispatches and reports is very great, especially in night scouting. It also has been clearly demonstrated in the Russian-Japanese war that a few concealed field telephone stations placed in advance of the main body of troops can secure and transmit to the commander far more information in much less time than could scores of the old-

GENERAL TELEPHONE ENGINEERING.

fashioned scouts. The proper and efficient operation of the signal corps is most vital to the success of any army, and in the efficient operation of any signal corps the telephone is the most valuable means.

Noisy Lines—KELSEY.—*Sound Waves, March.*

Continuing a more or less interrupted series of articles on this subject, this article takes up the causes and cures to a limited extent, and closes with the words, "In these days, there is no legitimate excuse for noisy lines."

Telephoning Through Water—Telephone Magazine, March.

A transmitter consisting of a speaking tube with a vibrating diaphragm at one end has the diaphragm end immersed in the body of water through which it is desired to transmit speech, one side of the diaphragm thus being in contact with the water while the other side is adapted to receive sound waves through the air; thus the air waves are converted into corresponding water waves of sound; the device is not electrical. The receiver for the water-transmitted sound consists of a diaphragm with one side in contact with the water, a carbon chamber being attached; the received vibrations thus are converted into electrical waves for affecting a telephone receiver of the ordinary kind. By turning the receiver in the water, the direction whence the sound comes may be determined.

The Barretter—LONG.—*Telephone Magazine, March.*

A description of the construction and working of this new instrument, with one illustration, supplemented by a circuit diagram.

Marconi's New Invention—Electrical World and Engineer, March 11.

In a speech in London, Mr. Marconi related his inability to receive more than twenty-four words per minute, and made the announcement that by the simple substitution of a telephone receiver for the previously used registering devices he was able to increase the speed to 100 words per minute. Following this, he has devised a magnetic detector enabling the faster rate of working to be attained with a recording means. In this report the telephone seems to have furnished an important element in the development, although discarded in the end.

Deaf to Hear by Telephone—Telephone Magazine, March.

This is not a new subject, and the article here is confined to a description of an improved device for the purpose, with a supplemental description of the anatomy of the ear.

Railway Composite Systems—WILDER.—*Sound Waves, March.*

An article of a series. The grounded circuit telephone and the grounded circuit telegraph working over the same wire forms a very simple problem to solve, as a condenser in the telephone circuit from the line wire to ground prevents leakage of the telegraph currents and an impedance coil of proper design in the telegraph circuit from the line wire to ground prevents leakage of the telephone currents and also so modifies the current impulses of the telegraph signals that they become inaudible to the telephone receiver. The condenser may be omitted from the telephone circuit if the resistances of that circuit are fairly high, but the working of the telegraph instruments is likely to be more or less unsatisfactory because of the leaks to ground through the telephone circuits. Also, the ringing currents of the magneto generators used for calling signals on the telephone system make the telegraph instruments chatter loudly. When a full metallic circuit is used for telephone service, the difficulty of the chattering of the telegraphic apparatus by the telephone ringing current may be overcome by using both of the line wires, both for telephone and telegraphic purposes. By this means, only one telegraphic circuit is formed of the two wires An impedance coil may be bridged across the telephone pair at each end and the telegraphic circuit may be completed from the center of this impedance coil to ground, thus giving a grounded telegraphic circuit and a full metallic telephone circuit. Condensers are not needed in the telephone circuit, and the two circuits operate entirely independently, with respect to magneto ringing as well as to all other details. Another method is to cut in an ordinary repeating coil between the telephone circuit and the telephone line pair, then connect the telegraph circuit from the middle of the line side of the repeating coil to ground. The line side of the repeating coil must be exactly balanced in this case, or the telegraphic disturbances will be heard on the telephone circuit. Repeating coils for this purpose must be specially designed, the author advising the use of the "cut-and-try" method resulting in a compromise between good talking and good telegraphing. It is hoped that the reader will be carried on through more modern and complete methods in a succeeding installment.

Composite Telephone Lines—Telegraph Age, March.

Composite lines, wires primarily designed for telegraph working, but equipped now with telephones for use to a limited extent simultaneously with the telegraph instruments, may now be found on many different railroads. The American Telephone and Telegraph Company has furnished "composite" apparatus for forty-five railroads. Various methods of arranging the circuits are resorted to; portable telephone sets may be used in conjunction with any of these arrangements. The total length of composited telegraph lines for railroad use is now about 20,000.

Simultaneous Telephony and Telegraphy—STONE.—*Telephony, March*

The theory of composite transmission is mentioned briefly and illustrated by one drawing showing the Morse wave modification as secured by impedance coils. Circuit diagrams are given for telephone and telegraph circuits, and the use of emergency sets, designed to be carried by railway trains, also is touched upon, with considerable detail of the set used by the A. T. & T. Co.

The Automatic Problem—KNEISEL, *Telephony, March.*

The fact that the "larger interests" have adhered to the manual board does not necessarily condemn the automatic. History of the telephonic art shows a tendency toward automatic devices. The Strowger, Bell, Lorimer and Faller systems are reviewed very briefly.

Concerning Telephone Switchboards—MCMEEN.—*Telephony, March.*

The earliest use of visual signals and central battery signaling power was in a trunking system in San Francisco, since known as the express system. Improvement in character of service and lessening of cost of giving service both were shown in these experiments, careful study showing these results to be the result of the signals and consequent positive supervision rather than of any system of trunking used; this led to the Worcester, Mass., experiment, where, in 1896, was installed the first visual signal multiple switchboard, the forerunner of the Bell common battery multiple switchboard of the largest offices of to-day. Circuit diagrams of the modern Bell relay multiple line and cord circuits are given, and their operation discussed. The busy test feature is one of interest in modern practice, as it frequently indicates more than a simple busy condition of the line; by variation of the nature of the test as heard by the testing operator, she may be advised that the line is not busy, but is out of order, etc., thus being able to give the calling party information of value to him.

Telephone Engineering—KELSEY.—*Electrical Review, March 11.*

Article XIV. of the series. In common battery systems using cut-off relays, the operation of the cut-off relay upon pulling into the line gives the subscriber an unpleasant click. A line relay balanced and permanently bridged dispenses with the cut-off relay altogether, and also avoids the click so disagreeable to the subscriber. The present installment is taken up with descriptions of the latter type of swithboard circuits and methods of operation, both two-wire and three-wire multiple systems being discussed, and three typical circuit diagrams being shown.

Independent Telephone Development

Review of Vinton A. Sears' New Booklet.

ONE of the most comprehensive and most powerful documents ever given to the public, having for its theme the Independent telephone industry, and intended as an argument in its behalf, is being widely circulated at the present time, and is accomplishing great good for the cause. Its title is "Telephone Development: Scope and Effect of Competition," and its author, Vinton A. Sears, a Boston banker, who sees a great future for Independent telephony, and who is a firm believer in the worth and stability of Independent securities as a paying investment. The book consists of 121 pages, and every page fairly bristles with facts and figures showing the growth, influence and mighty scope of the Independent movement.

This data has been secured from a thousand different sources, and altogether forms a mass of evidence that is simply overwhelming, and disposes in short order of any alleged argument that may be advanced by the opposition against the Independents and their sweeping crusade against the would-be monopoly company. There is scarcely a phase of the work in any part of the country that is not covered by Mr. Sears' compilation. Much of the data already has appeared in print in TELEPHONY and elsewhere, but much of it is new and of a sort that is sure to interest every worker in the Independent field, as well as all seekers after Independent truth. In his introduction Mr. Sears says:

The purpose of this booklet is to show that improved telephone service at equitable rates can be and is being furnished on a large scale throughout the country by telephone companies independent of all Bell patents or control, in successful competition with the old system, and making attractive earnings at rates which the old companies have always declared prohibitive and ruinous, and also to show the public benefits of telephone competition.

The most important improvements and the most modern high-class apparatus—that which furnishes the best class of service most economically—are to-day controlled by Independent companies. The enormous development and the resulting public benefits of this Independent work have not been generally known or understood by the people of New England, except in the few favored communities.

The following statistics, statements, articles, and letters have been obtained from well-informed and reliable authorities. Personal observation of and correspondence from a considerable portion of the field during the past five years confirm the statements and opinions quoted.

The object, then, is to encourage the development of the telephone by showing conclusively that better service and lower rates are already being enjoyed under competition. To present and prospective users of telephone service who are interested in securing for themselves and the public the best results, this information will be of interest, and to such it is respectfully submitted.

Mr. Sears treats the status of the telephone industry as follows, bringing his statistics up to the present time:

The status of the telephone industry to-day is shown approximately by the following statistics (1905):

BELL SYSTEMS UNDER TWENTY-FIVE YEARS OF PATENT PROTECTION.

Capitalization of licensee companies	$400,000,000
Am. Tel. & Tel. Co. stock	154,000,000
Am. Tel. & Tel. Co. bonds	38,000,000
Am. Tel. & Tel. Co. notes	20,000,000
Total	$602,000,000
Number of systems	44
Number of main exchanges	1,600
Number of branch offices	2,000
Number of switchboards	4,000
Subscribers	1,800,000

INDEPENDENT SYSTEMS UNDER EIGHT YEARS OF ESTABLISHED COMPETITION.

Invested capital	$250,000,000
Number of systems	5,000
Number of public exchanges	7,500
Number of switchboards	8,000
Subscribers to exchange service	2,000,000

WHY BELL RATES ARE HIGH.

Perhaps the main reason why Bell rates are high is that high rates are needed to pay dividends, and in the absence of competition *can be charged,* for the people must have telephones. The Bell companies have not only charged high rates, but have introduced blind systems of extortion, such as measured service, party lines, and extra charges for various accessories to the ordinary service. The main reasons why the Bell rates cannot well be equitable to the public are as follows:

High depreciation.
High capitalization.
High cost of equipment.
High cost of maintenance.
Royalties to parent company.
Lack of interest on the part of employes.

1. *Depreciation.*—Frequent rebuilding has been necessary, owing partly to the growth of the business for which the Bell companies generally failed to provide and partly to the improvements inaugurated in the equipment and construction.

"For nearly thirty years the Bell companies have been discarding switchboards and telephones. Improvement has followed improvement so rapidly that switchboards on which the varnish was hardly dry have gone to the scrap-heap to make way for the newer and better pattern. This constant replacing of one of the most important parts of the plant often costs money in amounts represented in seven figures." The switchboards in use to-day have cost the Bell companies about $40,000,000. "They took the place of the switchboards of yesterday, because somebody thought of a better way of doing the work, and when some other improvement is made the switchboards of to-day will be discarded to make room for those of to-morrow."

In other words, these manual switchboards always have a limited capacity, and when outgrown or out of date (and they are usually out of date when outgrown), must be discarded to make place for equipment of still larger capacity and further improved. And this enormous expense due to progress, growth and improvement has made a heavy depreciation account necessary.

2. *Capitalization.*—As everyone knows, much of the original stock of the parent Bell company sold at a ridiculously low price—as low as $2 per share or less—and that the present capital of the parent company (American Telephone & Telegraph Company) is made up of the original stock doubled over and over and over again; $100 worth of Bell stock purchased in the early days has since reached a valuation of $25,000 or more. Thus the present capital of the parent Bell company is many times larger than the actual capital invested.

In the organization of the Bell licensee companies it was the custom to charge fifty-one per cent or more of the new company's capital for the license (or privilege to do business). For example, it is understood that the New England Telephone & Telegraph Company, out of the original capital of about $11,000,000, paid $6,000,000 of stock to the parent Bell company. Then, to raise money for construction of plants, the New England company sold stock at $25 per share (twenty-five per cent of its par value). Its present value has been made out of the very large profits of the business, and its six per cent dividend represents an earning of several times six per cent on the actual capital invested.

3. *Cost of Equipment.*—The Bell licensee companies are further obliged by perpetual contract to purchase their equipment of a branch of the parent company (the Western Electric Company of Chicago and New York) at very high prices—much higher than the same class of equipment costs elsewhere.

4. *Maintenance.*—Owing to the fact that the Bell plants in the early days were necessarily crudely built and badly engineered, they have had to be rebuilt in part from time to time in order to keep pace, to a certain extent, with the demands of the service. This has resulted in making patchwork of all exchanges that have not been entirely rebuilt.

In the early days iron wire was used, strung entirely overhead on poles. City ordinances have from time to time compelled the putting of wires underground in cables. This has been done in part throughout the country, but not entirely, and the process is still under way. Several different kinds of transmitters have been adopted, then replaced by others. All of this old plant which is still in use means a heavy maintenance charge, and its replacement means very heavy expense, which, of course, ought to be charged to depreciation.

A still further reason for the high maintenance charges may be explained by the fact that there has developed in the operation of such a huge system an amount of "red tape" which is both displeasing as it comes in contact with the public, and expensive to

the company itself, for it stifles and discourages individual effort, ambition and progress.

5. *Royalties.*—The Bell licensee companies must pay royalties (or a percentage of gross earnings) on expired patents (by perpetual contracts) which, for the transmitter and receiver alone, amounts to $2 to $3 and upwards per year, while the market value of equally good instruments is only about $3 for outright purchase.

6. *Employes.*—The large number of able engineers and telephone men who have left the Bell companies and cast their lot energetically and enthusiastically with the Independent companies indicates the internal dissatisfaction in the ranks of Bell employes, which always reduces their efficiency and means increase of expense.

A further reason why rates are kept high (where they can be) is, that competition in hundreds of cities and towns has led the Bell companies to make "war rates" which are extraordinarily low and unprofitable, so that the deficiency must be made up from the monopoly districts. These conditions also show why the Bell companies must make heavy charges for depreciation, maintenance, royalties, expenses and dividends.

With these facts in view, no argument is necessary to show that the Independent companies—independent of Bell contracts, Bell patents, Bell costs, Bell royalties, Bell red tape, Bell ruts, war rates, and, if they please, independent of overcapitalization—can serve the public at reasonable rates with a fair profit.

Arthur W. Hoge, president of the Ideal Construction Company of Hopkinsville, Kentucky, and a well-known telephone engineer, contributes the following from experience and observations:

Vinton A. Sears, Esq., Boston, Mass.—My Dear Sir: Answering your letter of recent date relative to my experience and observations as a telephone engineer, permit me to state that you have assigned me a rather large subject, and one to which I can hardly do justice. The changes and betterments in telephone apparatus and method of construction in the past nine years are almost beyond belief. In the beginning the Independent telephone operators cautiously felt their way, fearful lest they tread in any meshes of the net the Bell telephone monopoly had so skillfully constructed during its many years of unopposed control of the telephone field and everything appertaining thereto. The many patents which they controlled and owned seemed to leave no opening for an entrance into this lucrative business. Fortified by capital and backed by strong financial and political interests as the Bell monopoly was, it was with fear and trembling that the few hardy pioneers in the Independent telephone industry entered the field, never knowing where they stood nor yet when their jealously guarded investments might not be submerged in the costs attendant on patent litigation and expected adverse decisions in the courts. Yet they persevered and to-day the Independent movement, with its huge invested capital upon which the investors are drawing handsome dividends, stands as a monument to their enterprise, perseverance and pluck.

There were no engineers to guide their footsteps nor yet financiers sufficiently strong and able to enable them to branch out and encompass the field. All the experienced telephone engineers and construction men were in the employ of the Bell, and the process of manufacture of good equipment was jealously guarded. Yet they did persevere. It is true that the apparatus which was used, or could be used without excessive fear of patent litigation, was crude in the extreme, and the highest cost of manufacture necessarily made the apparatus high-priced. Still it worked and gave satisfactory results. The construction, too, was in a formative stage. The fact that one wire with a ground return made a talking circuit was well known and, working from this knowledge, most plants were constructed with a ground return. Cables were unknown or, at the most, so excessively high-priced that they were beyond the reach of the average telephone exchange. High poles, with from one to as many as fifty and sixty cross-arms were used and, when their capacity was overtaxed, wires were knobbed between the pins and under the arms.

It was at this stage of the Independent development that my associate and I entered the field. Prior to this I had been a railroad civil engineer and he an electrical engineer in the employ of an electric lighting company.

With the passing of time, equipment became better as court decisions were rendered which were favorable to the interests of the Independents. More money was invested and larger interests took the field. Construction, too, became better as we learned from observation, separating the wheat from the chaff, rejecting poor ideas and substituting those which our own experience had taught us were better; adding here, discarding there, until the present high-class method of construction was evolved. New exchanges grew up in all localities; long-distance lines began to grow; a network of copper and iron wire drew the Independent operators into a closer union for an offensive fight. Associations for the further amalgamation of the Independent interests were born, until even the Bell, as Goliath of old, began to realize that it had met its master; younger in years, it is true, but still a sturdy young giant capable of standing a bruising fight and coming out the victor, even as did David; its slingshot loaded with equipment equally as good and construction far better, until to-day it holds the mastery in its own chosen field. To-day the Independent telephone exchanges are in the lead, and rapidly forging still further ahead.

When the Independent movement was first started, and for many years thereafter, it was a noticeable fact that there was to be found no bank or trust company which would undertake the task of underwriting a stock or bond issue for an Independent telephone company. They wished first to await developments, and, secondly, to note results. But they did send out their engineers and financial agents to investigate and report the facts, and the result has been that to-day a proposition requiring the expenditure of from $1,000,000 to $5,000,000 is more easily and readily financed than was the case with one requiring the expenditure of $50,000 six years ago. Eight years ago you could count on the fingers of one hand the number of men in the United States who had more than $50,000 of their own money invested in Independent telephone enterprises. To-day they can be numbered by the thousands.

To-day the Independent telephone movement numbers within its ranks more competent, skilful and capable telephone engineers than does the Bell system, which fact has done more to enhance the value of Independent telephone securities than any other item.

In the beginning, as before stated, the outside construction was crude and primitive. To-day the Independents have more excellently constructed telephone exchanges than has the Bell. In those days underground and all-cable construction was unknown, and the exchanges were built as cheaply as it was possible to construct them, and still give service. Yet, with all this, with excessive maintenance charges and a large percentage of depreciation, the pioneers made money, and, when the time came in the natural course of events for them to rebuild and reconstruct their obsolete systems, they were able, by placing the construction work in the hands of able and competent engineers and construction men, to rebuild and enlarge their systems to meet the requirements of the growing communities in which they were located at a considerable outlay, and yet pay dividends. All-cable construction, added to a comprehensive subway system, cut down the maintenance and depreciation charges to such a point that they in themselves enabled the exchanges to pay dividends on an increased capital.

To substantiate this statement it is only necessary for us to refer to the exchanges we ourselves have constructed within the past two years in the following cities and towns, namely, Lorain, Lima, St. Mary's, and Van Wert, Ohio, all of these exchanges being pioneers in the field, which were reconstructed and enlarged, and in all of which the securities of the original stockholders were enhanced in value by reason of the new work done. In other words, in the above-named exchanges, there is not a stockholder who could not at the present time sell his stock at an advance over his original investment.

The conclusion to be drawn from the above statement of facts is simply this. If investments in Independent telephone properties proved profitable under the adverse circumstances prevalent while the industry was in its infancy, why should they not prove more so now, with all conditions favorable?

Modern engineering has relegated the open wire plant to the junk heap, except in the suburbs and the country and on toll line construction, so that the maintenance and operating charges are one-half or less than half of what they were on the old-style systems. What is true in reference to construction is also true of equipment. To-day we are able to furnish city and suburban service superior to any that has hitherto been furnished. The introduction of the automatic telephone has worked a revolution in the telephone industry, even as did the linotype machine in the art of printing. The idle dream of Professor Bell has been realized. Did he not say more than a decade ago that the time would come when the telephone connections would be made without the intervention of an operator or a human connecting medium?

The automatic, or, as it is called, the "girlless, waitless, cussless" telephone, is here to stay, and it is a commercial and an economical success. By its aid the huge expense attendant on a manually operated board is done away with; beside, the secret and rapid service appeal with marked success as the most efficient service to the business man and the "lady of the house."

From a financial standpoint, the absence of operators and also the absence of the need of repairs on switchboard plugs and cords attendant on all manually operated boards, means a saving of large sums of money, as well as obviating the possibility of strikes or the failure through weariness on the part of the operator in making the proper connection. In other words, the automatic switch never sleeps or eats. It belongs to no union, never enters the field of matrimony, and is ready to work twenty-four hours out of every day. In dollars and cents, the automatic exchange entails a large saving over the manually operated board, which, to the investigator, is perhaps the entire "kernel in the nut," and it accomplishes this with an increased efficiency in service.

The telephone situation to-day, as we see it, is neither a game of chance nor guess work, but a simple, plain, cold-blooded business proposition, having for its ground work modern and skilful engineering and construction, using the best material and equipment that money can purchase, together with good business management

and proper rental charges for the service furnished. What the public demands to-day is good and efficient service and courteous treatment, in return for which they are ready and willing to pay a fair and equitable rental charge.

In conclusion, it will not come amiss to state that the battle is already won. The Independent movement is too widespread and universal to end in failure. The path blazed by the pioneer has become a national highway, cleared of all pitfalls, and good to look upon. Many men of honor, integrity and high financial standing are enlisted in the ranks. Trust companies and banks without number hold Independent stocks and securities. The Bell company is no longer a giant to be feared; rather it is a concern to be looked upon with compassion, for it has seen its best days. To-day, the Bell company, after twenty-four years of corporate existence, together with all of its sub-licensee companies, have fewer telephones in service than have the Independents. The movement is but ten years old. What will the future bring?

Very truly yours,

ARTHUR W. HOGE, President.

Mr. Sears called upon Don Farnsworth of New York, whose work as a promoter of Independent telephone enterprises has made him well known, for his views in relation to Independent telephone securities in the east, and received the following reply:

Vinton A. Sears, Boston, Mass.—Dear Sir: I have received yours of February 4th, asking my views in relation to Independent telephone securities and the indisposition of eastern capital to invest in them I take pleasure in giving you the result of my experience and information on the subject so far as I am able to do so in a letter. For several years I have been so engaged that among the most prominent of my duties has been the investigation of corporate enterprises and the best method of making investments. This I had to do both from the standpoint of a manufacturer and that of an investor.

I decided some time since to take up the business, on behalf of myself and others, of investigating that class of securities which would insure the principal and give a good return to the investor. Among other investments, my attention was called to Independent telephone securities by persons of the highest financial standing and whose knowledge of values could be relied upon. Taking this as a nucleus, I sought statistics and information from reliable sources and ascertained that few fields presented more attractive inducements to the investor than telephone bonds. The securities are good and the returns satisfactory. The proof of the value of any security is established by two facts:

First. That the plant has justified the outlay and represents the value of the investment.

Second. That it has an earning power which produces ample if not generous results. According to the statistics, the Independent telephone exchanges of to-day have invested over two hundred millions of dollars, which have been expended in the best possible construction to install and maintain plants of the highest efficiency, at the same time reducing the expenses to the minimum. You can understand that this was necessary, as from the outset it had to compete with an established business and to control, or even obtain, a fair percentage of this business they had to show an excellence in result superior to that of the existing companies or else give the same service at a lower rate.

It is true that the Independent companies had the advantage of avoiding the experimental stage, which had cost the older companies were heavily. For instance, the Bell telephone companies' stocks originally sold at nominal figures, thus requiring the income to be applied to excessive capitalization when but a small portion of it was applied to the equipment of its plants or the extension of its business; yet to-day its securities, or most of them, are sold as high-grade investments.

The Independent companies, with their investment of over $200,000,000, present a showing wherein the default does not equal one-half of one per cent, and their profits have in most instances been large. The query naturally follows: "Why does eastern capital hesitate to seek such investments?" The reply is threefold:

First. Their ignorance of the subject; that is, the want of knowledge on the part of the bona-fide investor.

Second. It is to the interest of the eastern manipulators, who generally represent the combined industries or trusts, to discourage investment in enterprises which they do not control, for the purpose of advancing those which they do control, and to enable these companies to monopolize the business.

Third. As the moneyed centers are in the east and the managers of the trust to a great extent control the eastern capital and are thus enabled to control prices, the investor seeks that investment which commands a cash value, even though it may fluctuate.

The lack of knowledge arises from the fact that it is impossible to bring detailed information of a small enterprise before the public at large, as the expenditure necessary to give the information would not be justified, and the conservative methods pursued by business men who prize their character more highly than dollars will not permit them to make the great flourish of profits anticipated, but rarely, if ever, realized, that so frequently appear in the inducements offered by large organizations—nor do they select men of national reputation to whom large blocks of stocks are donated for the privilege of inserting their names as members of the board of directors, and thus give credit to an undertaking which is not warranted. But I think the chief reason is that the small investor is so occupied and absorbed in his individual work of accumulating a competency that he leaves investments to the judgment of someone who has gained his confidence, and too frequently becomes the dupe of design or mistake. I think also might be added, among many other reasons, the fact that the conservative investor has not yet realized the fact that the rapidly developing west has reached the stage of sobriety and stability in business.

I am of the opinion, based upon my efforts for the past six months, assisted by a large office force devoted almost entirely to gathering, classifying and compiling statistics on Independent securities, especially telephone plants, that no securities will command the approval of capital, both east and west, to a greater degree than those of Independent telephone companies. As a rule, they are not overcapitalized; there have been no mergers in which an overvaluation was paid for several plants and a large block of unearned stock, for which no consideration was paid, issued to the manipulators of the merger, and investors who take out these securities realize not only good returns, but large advances, which are based upon a continually increasing income and, in the event of mergers, they will be able to sell at an advanced price.

The future of the Independent telephone industry is no longer a question. It has become a commercial necessity and a necessary servant not only in the cities, but in the towns and even in the country, and its percentage of increase will continue for many years. The improvement in systems, appliances and mechanical devices will enable it to conduct its business at a minimum expense, and the progressive American pays readily for quick and efficient service.

While the country is favorable to competition, it seeks that competition which prevents monopoly and gives efficient service, but does not encourage competition which is unable to meet this demand. The policy of the Bell telephone company has been to stifle competition and create a monopoly, which was necessary for its existence, owing to the vast liabilities it incurred by selling stock at a nominal price and buying up competitors regardless of values received, thus enabling it to fix tolls at the expense of its patrons, which would enable it to satisfy its creditors and stockholders.

This is un-American and has not failed to create a strong sentiment against the company, and its treatment of Independent companies has been such as to arouse a determined opposition, which has resulted in the establishment by Independent companies of more telephones than are now owned by the Bell company and its associated companies. This condition will continue and the percentage of increase by the Independent companies will, in my opinion, advance. The public will in time be educated to the fact that it can find a safer and more profitable investment in the Independent companies than in the large, overcapitalized trust, and this will be accomplished by the united effort of the Independent companies to present the true facts, which will result in the enhancement of their stocks and a demand that will cause them to be sought rather than to seek a market.

DON FARNSWORTH.

Another notable contribution to Mr. Sears' symposium is an article on "How the Bell Lost Its Grip," by LeRoy W. Stanton, consulting electrical engineer, member International Electrical Congress, American Institute of Electrical Engineers, American Society of Mechanical Engineers, Chicago Electrical Association, Cleveland Electrical Club. It follows in full:

To persons or investors who are unfamiliar with the telephone situation, the statement that the Bell telephone company has already reached its zenith and is on the "down grade," and that most of the Bell securities have less intrinsic value than the securities of Independent telephone companies, seems hardly possible. From the following analysis the reasons for this condition will be seen:

Soon after the birth of the telephone it became a monopoly known as the American Bell Telephone Company, which company adopted the plan of establishing licensee companies in different parts of the country to control the electrical transmission of speech; these licensee companies, paying for their exclusive rights, a large percentage of their capital stock,—51 per cent in nearly every case. In addition to the stock paid to the parent company, heavy royalties were also required,—as much as $14 annually per telephone for many years. These licensee companies having no competition were able to and did exact extortionate rates from their subscribers, which produced large earnings to such an extent that it came to be the custom to capitalize these companies at several times the real cost of the properties.

In addition to inflated capitalization the licensee companies, as a rule, did not charge off the worn-out and out-of-date equipment, but simply increased the capital when they needed the additional money to rebuild and re-equip their plants. After the Independent

telephone movement started, in a number of cases the Bell companies bought out the Independent exchanges, but at high prices, and without benefit, because competition started over again on an improved and permanent basis in nearly every instance. In other places the Bell company spent thousands of dollars to prevent the granting of franchises and hundreds of thousands more in fighting the Independent companies. All this expense tended to increase the capitalization, while the cut rates adopted as a means of fighting competition decreased the earnings of the Bell companies. "War rates", have been instituted almost everywhere by the Bell companies in their vain effort to head off competition.

In the early nineties, when the fundamental telephone patents expired, hundreds of Independent telephone plants sprang into existence in all parts of the country, and, owing to their low rates and the public sentiment against the Bell telephone companies, the new companies, almost without exception, secured far more subscribers than the Bell companies had ever had. This in many cases reduced the Bell companies' list of subscribers to almost nothing, and in several cases throughout the central west, the Bell companies' franchises were revoked and they were compelled to take down their poles and wires and go out of business. In other places they gave free service to hold their subscription list, while, almost without exception, the Independent companies secured business without cutting the rates which they established when they first started in competition with the Bell companies.

The Independent companies in the central west, realizing the necessity for long-distance service, have developed a magnificent long-distance system, giving a service superior to that rendered by the Bell companies, owing to the fact that they reach more telephones. In the states of Ohio, Indiana, Illinois, Michigan and a number of the states in the central west, the Independent companies have twice as many telephones and more miles of long-distance lines than the combined mileage of the Bell telephone companies in the same territory.

In the territory covered by the states above mentioned, the Bell companies have lost a considerable part of their paid subscription list; this has been so universal that it has forced some of the Bell licensee companies into bankruptcy: namely, the Michigan Bell Company, which went into the hands of a receiver more than a year ago with a deficit of several millions of dollars; the Central Union Telephone Company, operating in Ohio, Indiana, and Illinois, is practically bankrupt, having an indebtedness of over $6,000,000. And the Iowa Bell Company has met practically the same fate.

A number of the Bell company's engineers, who foresaw the conditions which must inevitably follow the expiration of the fundamental patents, took up work in the Independent field, and have developed apparatus which is superior to that manufactured for the Bell companies. These statements are borne out by the fact that the gold medals which were awarded at the Pan-American Exposition at Buffalo, and at the Louisiana Purchase Exposition at St. Louis, were to manufacturers supplying apparatus to the Independent field. The automatic telephone system, which is gaining favor in many places, has been developed by Independent telephone engineers, or by those in opposition to the Bell telephone company.

Owing to the keen competition among the Independent manufacturers, the operating companies are able to purchase any part of the equipment for considerably less money than the Bell companies, who are compelled by contract to purchase from the Western Electric Company, which is the manufacturing branch of the parent Bell company. The Bell licensee companies, besides having to pay a higher price for what they purchase, are also compelled to pay a royalty on certain parts of the equipment, which is now usually as great per year as the cost of similar equipment to the Independent companies. From the foregoing it will be seen that there are six reasons why the Bell telephone company cannot compete evenly with the Independent companies.

First. Capitalization is much greater than the real cost of the properties, making it impossible for them to meet competitive rates and pay interest and dividends on the inflated capitalization.

Second. The Independent companies are more popular, being for the people and of the people.

Third. The Independents in many places reach more people and the Independent movement is growing rapidly in all parts of the country.

Fourth. The Bell companies' apparatus is to-day conceded by experts to be inferior to that of the latest types of the Independent companies.

Fifth. The Independents are able to purchase telephones outright for about the same amount that is usually charged the Bell licensees for yearly rental.

Sixth. In many places, the long-distance lines of the Independent companies exceed in mileage and number of telephones, and excel in quality of service those of the Bell telephone companies, and this condition is growing more in favor of the Independent companies every day.

From the above it will be seen that a competitor of the Bell system, with the best of construction and equipment, with a normal capitalization and enterprising, progressive and courteous management—all in the interest of the telephone-using public—must be able to furnish a satisfactory, equitable and profitable telephone service, and must become one of the most important and permanently successful of the public utility corporations.

This actual conditions of affairs has been so conclusively shown that the infinitesimal number of exceptions only serve to prove the established rule.

Mr. Sears' work concludes with a large map showing Independent telephone toll lines in New York, New Jersey and Pennsylvania, and connections made by these lines with Vermont, Delaware, Maryland, Virginia, West Virginia, Ohio and the west. It represents a vast amount of work and is very interesting, as well as invaluable for reference.

Mr. Sears is to be commended for his effort in producing this booklet on "Telephone Development," as it speaks volumes for his energy, enterprise, loyalty to and deep interest in the cause of Independent telephony, and cannot other than contribute to the further success of the great movement, as well as spreading the gospel of the Independents far and wide.

BELL METHODS AROUSE NEBRASKANS.

Excitement is at a white heat in Fairbury, over a telephone fight which is on in earnest between the Fairbury Telephone Company, an Independent system, and the Nebraska (Bell) Telephone Company. Recently it resolved itself into a mass meeting of the citizens to protest against the methods employed by the Bell company. Over a thousand people attended the meeting and many were turned away. S. M. Bailey was elected chairman and addresses were made by Col. George E. Jenkins, John Heasty, Judge C. B. Letton, W. F. Cramb, W. F. Downey, John Hartigan, Mayor S. W. Dodge, Dr. G. L. Pritchett, Dr. Andrews, L. J. Nutzman, A. F. Smith, and many other citizens. The speakers were again and again applauded and great enthusiasm prevailed throughout the meeting. The following resolution was submitted and passed by a unanimous vote:

WHEREAS, The Nebraska Bell company is endeavoring to compel the merchants of Fairbury to install the telephone of that company in their respective places of business and thus force them to incur a useless and needless expense in the conduct of their business; and,

WHEREAS, said Bell company has often maintained that two telephone systems in a community are an unnecessary tax upon the business men and an inconvenience and annoyance to telephone users; and,

WHEREAS, failing in a legitimate and honorable manner to induce the people of this community to patronize it, this corporation now purposes to force us into submission. It openly boasts that the people of Fairbury can be corrupted and intimidated by means of the great wealth of a conscienceless corporation; be it, therefore,

Resolved by the citizens of Fairbury in mass meeting assembled that we are also of the opinion that two telephone systems are a useless tax and annoyance and detriment to the best interests of the people of a community, and we unqualifiedly and emphatically condemn the methods used by the Bell corporation in its endeavor to force the city of Fairbury against its will into the use of two telephone systems.

The meeting pledged sympathy and support to the business men of Fairbury "in the brave stand they are making against the efforts of this corporation," and reaffirmed the declaration of independence in vigorous terms.

About five years ago the Independent company was started at Fairbury, since which time the business men without an exception have used their telephones to the exclusion of the Nebraska company. A short time ago, it is claimed, managers of the Bell company rented a store room at Fairbury, and it was announced that a stock of groceries and meats would be put in and would be sold at cost until the merchants were forced to use their telephones. Recently a stock of groceries appeared upon the scene and was opened under the name of the Fairbury Cash Grocery Company. It is believed that lack of patronage will drive the "Bell grocery" out of business.

Maintenance of Switchboard Cords

CHARLES H. COAR

IN all telephone switchboards wherein flexible conductors are employed to complete the various connections between the subscribers one of the most troublesome features to be contended with is the maintenance of the connecting cords. The cords are constructed in such manner as to be sufficiently flexible and contain the necessary amount of conductors without being cumbersome. This, of course, makes the cords subject to faulty operations more readily than would be the case if they were simply constructed to withstand wear, regardless of size.

Cords composed of tinsel conductors are, in large switchboards, a source of various kinds of trouble, which, in most instances, proves very difficult to locate because of the fact that there are so many duplicate sets under each operator's

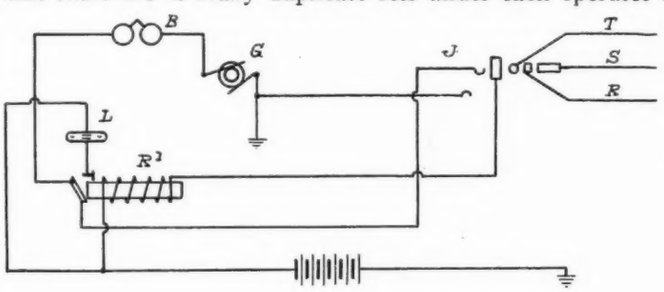


FIG. 1.

supervision with which the various connections are made. Cut-out, or so-called "scratchy" cords, undoubtedly cause more unlocatable trouble than is imagined, and in view of eliminating this trouble as much as possible, frequent tests are made of the different cords in well regulated exchanges. For instance, take a cord which is scratchy, or in other words one in which the conductors have become so worn as to be partially broken or in contact with each other at times. Such a cord may be used again and again without showing the least indications of trouble, but often when moved or jarred in some certain manner it will become totally unfit for communication. It will readily be seen that intermittent trouble occurring in cords of this description is very difficult to locate, as the cords which become faulty in this manner may not be discovered for some time.

In all cord circuits wherein complete supervision is provided the answering operator, a signal, termed the supervisory signal, is associated with each cord in such manner that its operation conveys a certain intelligence to the operator which enables her to know when her connections are completed, etc. The supervisory signals may be of a mechanical construction or a lamp, but are in either case, in most instances, worked in conjunction with the auxiliary contacts of a relay placed directly in the cord circuit. It becomes necessary very often to adjust these relays in order that they may perform their different functions in a proper manner. Many simple appliances have been devised in view of facilitating the test for such troubles, as has been mentioned, in addition to any other faults which are liable to appear during operation.

In most all the 20 and 24-volt central-energy systems the supervisory relays are adjusted to such a degree that their auxiliary contacts are closed when the current of the cord in which they are placed flows through a resistance of approximately 750 ohms, and that these contacts are opened when the cord current flows through a resistance of 10,000 ohms. As the connecting cords become worn and the insulation becomes dampened from handling, the liability for false supervisory signals is considerably increased, and the circuit shown in Fig. 1 was designed with the intention of providing the different operators with a convenient cord test which would enable them to readily ascertain the good cords from the faulty. The general idea, as shown in Fig. 1, is to have a test jack adapted to fit the switchboard plugs, every fourth panel or so throughout the entire switchboard in such a position that the different operators can test the cords under their supervision.

An arrangement of resistances is connected to the test jacks in common in view of having all the jacks under similar electrical conditions as nearly as possible. In Fig. 1 the test jacks are represented by *J* and *J1*; *R1* is a 30-ohm relay, *C1* and *C2* are the shunt resistances and *A*, *B* and *C* are the collector rings or commutators, which are in common connection with the shaft upon which they are mounted. The driving power is not shown for simplicity, as this would vary considerably under different circumstances, but the shaft should revolve between fifteen and twenty times per minute to obtain the best results. The blocked portions of the collector rings *A* and *C* prevent electrical contact at these points. Because most companies having supervisory relays adjust them to operate through a resistance of 750 ohms and to release through a circuit of 10,000, in this instance we will make the resistance of *C1* 700 ohms and that of *C2* 9,950 ohms, thus allowing fifty ohms for the connecting conductors. Assuming now that the operator has a cord she wishes to test and that it is plugged into the test jack *J*, when battery current would feed from the sleeve conductor in the usual manner through the winding on the relay *R1*, which could be utilized, if deemed necessary, to start the power revolving the shaft, as shown at point *M*. The direction of rotation is shown by the arrow.

In the circuit shown both shunts are connected to the test jack, and it will be noticed that the *C1* brush is about to break contact, while *C2* has been in contact for some time. This is done in view of maintaining the cord supervisory relay under test in a magnetic condition at the time the 9,950

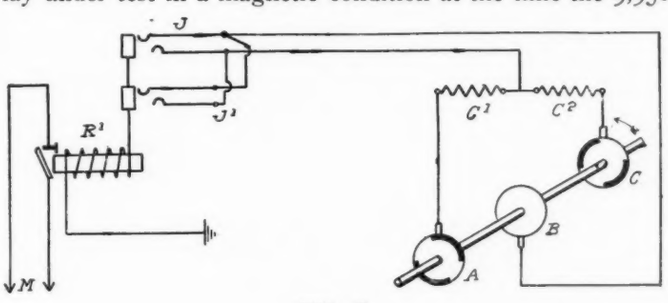


FIG. 2.

ohm coil is introduced into the circuit, in order that a good "sticking" test be secured. If the relay failed to release its armature under this condition it should be readjusted until it did so. An exactly opposite effect is desired when the relays are being tested for "pulling power," or magnetic attraction for their armatures, and because of this reason no circuit is provided across the terminals of the test jack just prior to the time that the 700-ohm coil is introduced. This is done to afford the relay under test time in which to resume a lax magnetic condition before the cord current is applied through the 700-ohm coil.

Now presuming that an operator wished to test a cord which did not seem to give correct signals, she would plug

this cord into the test jack, thus starting the resistance commutators, if such arrangements were made, but in any event the 9,950 and 700-ohm coils would be placed across the jack terminals alternately, and consequently the supervisory lamp signal should be displayed and put out at regular intervals. If the signals failed to operate successfully under this test, the cords in question should be referred to the switchboard men, who could properly adjust the signals or replace the cords as the occasion demanded. This test would not necessarily give indications of scratchy cords, unless the same be very bad, but the test does provide a ready and handy method of locating and adjusting faulty cord relays to both the men and operators. It was not deemed necessary to show the circuit of a cord in conjunction with this circuit, for the reason that cord circuits vary considerably, and the circuit herein described can be altered to suit almost any cord circuit. Once the idea is conveyed many changes will come to mind which will prove of special interest in different instances.

When the trouble is located in the cords it is best to remove the faulty cords entirely from the switchboard and repair them at a work-bench arranged for this purpose. It is good practice to test the cords at the work-bench in some suitable manner as an extra precaution against any unnecessary work on cords which were removed from the switchboard as being faulty. The combination of apparatus shown in Fig. 2 is designed for the repair bench, and the idea is to have a convenient method of testing the cord conductors for continuity of circuit, shorts, etc., while the cords are in a stationary condition as well as when they are twisted. The apparatus involved is a 1,000-ohm polarized bell *B*, a subscriber's line lamp *L*, a jack *J*, adapted to fit the switchboard plugs, and a 30-ohm relay *R*, all as shown in connection with ringing generator and storage battery.

Now let us assume that we wish to test some cords recently taken from the switchboard as faulty, before we proceed to remove the plugs. When a cord is plugged in to the jack *J*, and the bell *B* does not ring nor the lamp *L* light, it proves the cord free from any short-circuits between any of its conductors. If the cord conductors be continuous and the tip and ring conductors be connected together, power will flow from the ringing generator *G* through the bell *B* and relay contacts, up to the ring of the jack *J*, and out this and back the tip conductor to the ground terminal of the generator, thus completing the circuit and ringing the bell, showing that the tip and ring conductors are continuous. If the sleeve conductor be now connected to the tip and ring, the relay *R* is energized, thus attracting its armature and causing the lamp *L* to light and the bell to cease ringing. While the cord conductors are held in this position, the lamp *L* would show as long as all the cord conductors were continuous, but in case any one conductor breaks it either opens the lamp or relay circuit, thus extinguishing the lamp. The lamp and relay are placed in multiple to earth when all the conductors are good and in contact with each other. With this arrangement it is a comparatively easy task to locate which conductors are faulty in case a proper test is not secured.

While the cord is being tested it should be twisted and shaken, so that any trouble which is likely to appear during handling will manifest itself. If a lamp or bell operation is caused during this twisting, when the conductors are not held in contact with each other, it proves that a circuit is formed at times between some of the conductors. A cord having trouble of this nature is very liable to be in fault inside the plug, or in that portion immediately outside, so that often the cord can be repaired by simply cutting off a portion at this end. The use of tinned steel for cord conductors has done much toward eliminating cord trouble and its use for this purpose is becoming greater as its merits are more fully understood. Cords constructed with steel conductors rarely "cut" or "scratch" unless it comes from accidental contact between the conductors, due to defective insulation. When the weaker portion of steel in a cord is put under strain it breaks that conductor in such manner that it will become entirely open, thus forestalling its further use until repairs are made.

In many instances cords will be turned up or laid aside as being faulty, when in reality the trouble exists in the plugs, which become so worn or loosened by usage that the different parts will not make proper contact with the jack springs. It is well to examine the plugs on all the cords turned up as being faulty and also to calibrate the plugs on such cords as are removed from the switchboard for repairs. This would gradually weed out the plugs having loosened parts or those which have become so worn as to measure small. By using a micrometer for this purpose it is possible to obtain a very accurate measurement of the plugs without consuming much time. The sleeve or body part of the plugs usually wears most at that portion immediately next to the ring conductor, so it is only necessary to measure the plug at this point to obtain a fair average of the remaining portions, but the plug under test should be turned so that several diameter measurements will be obtained at the same point, which should indicate whether the plug was being worn equally around its circumference or otherwise. The amount a plug can be worn without becoming defective depends somewhat on the construction of the plug and also the jack springs it is adapted to fit, but it is safe to assume that the majority of plugs used in central energy systems should be cast aside if they measure five mils under the finished dimension.

To prevent the moisture due to handling from interfering with the conductor insulation and to strengthen the wearing portions, cords are sometimes boiled in paraffin for a distance of two feet from the plug end. The paraffin thus absorbed prevents the cloth wrappings from raveling and also fills in any vacant space between the conductors and coverings, thus insuring better wearing ability as well as increasing the insulation. It is well to keep a record of any cords repaired, whereon it is possible to state the nature of the trouble, the position cord was removed from, by whom repaired, dates, etc. These records would supply data from which it would be possible to figure the average life of cords, at what positions the cords were being roughly handled, etc. Operators who are not ambidextrous invariably use on every occasion a few cords convenient to their reach, instead of dividing the work among the different cords under their supervision. If the distribution of lines in a switchboard is good, one of the simplest methods of distributing the load among the cords during service is to select a cord nearest the jack under operation.

A SHORT CUT IN TELEPHONING.

To save time at the telephone, many business houses post near the transmitter a card or sheet bearing the names of the firms with whom communication is most often held, together with their telephone numbers. In this way constant reference to the telephone book is eliminated and much time saved in the course of a week. The same scheme is used by the large factories and stores, where telephone connections between the departments are maintained.

A convenient telephone directory for this purpose may be made by cutting from a piece of cardboard a 3¾-inch disk with a one-inch hole in the center. Upon this disk may be written or printed a list of as many as fifty names and numbers that are often needed. The disk may be fastened to the telephone by unscrewing the mouthpiece of the transmitter and inserting the threaded part in the center hole of the disk; then, replacing the transmitter mouthpiece on the telephone.

This scheme is especially valuable when a branch exchange exists in a factory or office.

Powerful Reply to a Bell Attack

IT WOULD seem that the Bell company, which, time and again in the past, has caused to be circulated slanderous and false reports regarding Independent telephone companies, only to retire in confusion when the truth became known, would profit by its numerous disastrous experiences in this respect, but evidently the Bell company, whose chief argument in dealing with its competitors is wilful misrepresentation and villification, has not yet learned the lesson of fairness and decency. One of the Bell's latest spasms in this respect is its underhand attack on the Inter-State Telephone Company of Aurora, Illinois, which has one of the finest Independent systems in the country, and whose success as an operating company, and from a financial standpoint as well, has been one of the brighest spots in the history of Independent telephony.

The attack was published in an out-of-the-way periodical, and then thousands of copies were bought up and circulated in the territory covered by the Inter-State company. C. B. Cheadle of Joliet, secretary and treasurer of the Inter-State company, replied to the venomous charges in a manner that has made the hirelings of the "natural monopoly" company run to cover—for the present at least. Mr. Cheadle issued this reply in the form of a letter—a strong, ringing document—to each of the stockholders of the Inter-State company, and has likewise favored TELEPHONY with a copy, the text of which follows in full:

Joliet, Ill., March 18, 1905.

Dear Sir:—You may have noticed recently in the columns of an obscure periodical a vicious attack upon the business methods and management of the Inter-State Independent Telephone and Telegraph Company. Copies of the article referred to were very generally distributed among the stockholders and patrons of the telephone company. This was one of a series of articles that has appeared in this journal recently, attacking a number of the leading Independent telephone companies in the middle west. It has been the policy of the Inter-State company to pay little attention to such attacks, but rather to devote its time and energies to furnishing very much needed telephone service in the communities in which it operates, and so far as I know and believe it will continue to pursue the same policy. I feel, however, that in justice to my friends, so many of whom, like myself, have invested in the securities of this company, a word suggested by the article in question may not be out of place at this time.

In weighing the words of a writer or speaker the thoughtful reader or listener first interests himself in the position that the writer or speaker occupies relative to the subject matter of his discourse. He in a measure is regarded as a witness upon the stand, whose interest or lack of interest, apparent fairness, truthfulness and candor, or lack of the same, his means of knowing the things about which he writes or speaks, or his lack of such means, are proper subjects for consideration by the reader or listener in determining what weight, if any, to give to his statements.

The first question that suggests itself in connection with the article is: From what source does it come? No answer is found in the article itself, or from anything connected therewith, except from the fact of its publication and industrious distribution among a certain class of people. That three or more issues of this journal containing attacks upon three or more Independent telephone companies were distributed simultaneously with the publication thereof among the stockholders of the companies respectively, shows pretty conclusively that the articles were inspired and disseminated by interests antagonistic to the companies attacked. The evident purpose of the articles is to hinder and cripple the work of the Independent companies in question, and the only interests such injuries could benefit would be those of the Bell telephone company.

It has become proverbial that the Bell company dares not come out into the open in these attacks, but hides behind the cloak of another. It knows that it has lied to the people so often that it would not be believed if it were to become sponsor for its own statements. If your memory is sufficiently retentive you may possibly remember what excellent service was afforded you by the Bell company prior to the entry of the Independent company into the field. You may remember also the exceedingly courteous treatment with which your complaints were received when your telephone was out of order or service unsatisfactory. You may remember also how the company voluntarily came to you and told you that it had been charging you too much for its service, and proposed to make a reduction in the price of the same, say from $60 per year here in Joliet to $30, which the Inter-State is now charging. You may recall how they frequently replaced their old equipment with new, up-to-date appliances, seeking always to make their service the best and their prices most reasonable, and the treatment of their patrons most satisfactory. How they offered to build lines throughout the country, reaching every farmhouse, installing exchanges in every village and hamlet, and giving to every person desiring it, an up-to-date service at a popular price, thereby annihilating distance, bringing friends and relatives together, and adding greatly to the measure of human happiness in your community and mine. I say, if your memory is sufficiently retentive you may possibly remember these things, but I confess to a slight aberration in this regard that prevents my recalling these circumstances.

I do, however, recall the fact that up to about five years ago the Bell company here, after some twenty-five years' exclusive occupation of the field, had a system of probably 600 telephones of the old magneto type, some of the instruments of which had been in use for the greater part of a generation, and for the use of which they had charged the people $60 per year; that the service they furnished was most exasperating; that complaints of incivility and inattention on the part of the employes were wholly disregarded; that the farming districts and smaller towns and villages could not obtain telephone service at any price; that the minimum charge for toll service even to the next town was twenty-five cents. I remember also just a few years ago they warned the people not to use Independent telephones on account of its being a violation of patent rights; how they told the people that twenty-five years' experience had shown that a telephone system could not be operated with profit at prices lower than those then being charged by that company. I remember also that the Bell company at that time contended that the larger a telephone exchange became the more it costs per telephone to operate and maintain the same. I remember how they endeavored to dissuade the people from giving the Northwestern Telephone Company an opportunity to prove the falsity of their statements; how they immediately cut their prices some twenty or forty per cent, although they had stated in substance that such a cut would prevent their operating their plants at a profit; how they went into court and sought the aid of the judiciary; how the Northwestern won out on every contention made by it, for which see Chicago Telephone Company vs. Northwestern Telephone Company, 199 Illinois, page 324. I remember that during the past five years the telephone has become the popular means of communication among our people; that the farmer and the merchant through the facilities afforded them by the Inter-State company (successor to the Northwestern) have been brought into closest touch with every other farmer and merchant in their community.

While writing this I called up our Plainfield office and learned that we have 575 telephones in use there, a fact deemed impossible until demonstrated by the Northwestern. I have seen the number of telephones grow here in Joliet to six times the number there was six years ago. I have seen the prices reduced from thirty to fifty per cent. I have seen the service bettered to an extent that cannot be computed, and yet we are told that two telephones are a nuisance, and that the Inter-State, especially, is a nuisance. If you will show me a city that has not had the invigorating influence of a competing telephone system, I will show you a city where poor service exists, and telephone use has not been developed or popularized. I remember the contention of the Bell company that the telephone business is a natural monopoly. Under the Bell patents it had been an artificial monopoly for many years. I remember also how they absolutely ignored the very existence of Independent companies during their early history; how, when it did notice them, they were treated with supreme contempt, but I have also noticed recently how exceedingly anxious the Bell company is to court the favor of the smaller Independent companies with a view of getting their toll business. I have thus seen by their own acts how the statement that they had been furnishing telephone service at the lowest prices at which it could be furnished consistent with a reasonable return on the investment has been proven false, for notwithstanding the reduction in prices and the large increase of telephones in exchanges, which they say adds to the cost of operation and maintenance per telephone, they are still paying ten per cent dividends on their stock and spending money

lavishly in an attempt to keep pace with the Independent companies that have become their competitors. I have seen how their statement that the user of an Independent telephone was a violator of their patent rights is false by decisions of our highest courts. I have seen how their contention that the telephone business is a natural monopoly is false by the establishing of Independent telephone systems in practically every city, village and hamlet throughout the middle west. In fact, I have seen every material statement made by them concerning Independent telephone plants proven false.

I am, therefore, inclined to question statements emanating from that source. The article purports to be a warning to people not to invest in the securities of the Inter-State company because, as the writer claims, the business of the Inter-State company is not established on a basis that will make such investment secure. If it were true that the business of the Inter-State company is being conducted on a basis that means its speedy ruin, as the Bell company would have you believe, for I must treat the articles as emanating from that source, then it would be greatly to the interest of the Bell company to remain silent and await the time when it could reap the full benefit of the Inter-State company's disaster, and not furnish information (?) that will point the way to the Inter-State company to mend its course and thereby prevent such disaster. If the Bell company is anything, it is selfish, and if it really believed the Inter-State company to be in such a desperate way it would keep that fact to itself and await the return of its own golden harvest. But the Bell company does not believe its own statements. It knows that if the Inter-State company shall continue in its present methods that not only will the Inter-State prosper but the Bell company will find in it in the future, as it has in the past, one of the most successful of the great many successful competing companies that have forced it to reasonable prices and satisfactory service.

The only answer to the article referred to required, if any, is the fact that instead of a completed property, which is assumed in the article, the Inter-State company's property has never been in a condition where over two-thirds of the money invested was productive of an income. The only surprising thing about it all is that the company has ever been able to pay a dividend at all during the construction period, and the writer of the article admits that the dividends that have been paid were paid out of the net earnings of the company. The next few months will see a large reduction in the proportion of unproductive property when the Peoria exchange shall be placed in operation. The Peoria exchange will be more than twice as large as any that the Inter-State is now operating. It is nearing completion and of course the moneys invested in it are not now producing a dollar of revenue. With that exchange in operation and toll connections made, that will then immediately be made, the business will be very largely increased, and the Bell company will be welcome to all the consolation it can get out of a comparison of earnings, expenses, etc., at that time. The fact that the Inter-State pays dividends seems to worry the Bell greatly. If I were a stockholder in the Bell company I would secure the removal of every officer of the company who spends its money in paying per line the cost of such articles and the expense of distributing the same, thereby giving to its competitor the benefit of free advertising. The Inter-State uses its money to pay dividends instead, to the aforesaid annoyance of the Bell company.

At the present time any technical computation or comparison of the per cent of gross earnings, net earnings, operating and maintenance expenses and the like between one period of construction and another period of construction is wholly without any significance or interest to you or to me or to anyone else interested in the company. In the company are a large number of the hardest headed business men of Illinois and other states, many of them having invested large sums of money, and I remember attending a meeting of the board of directors within the last sixty days at which many of these men were present, and at which the affairs of the company were carefully gone over and discussed and the greatest satisfaction and enthusiasm manifested by all present. The Bell company is not only afraid that its dire predictions will not come true, but it *knows* they will not come true. It knows further that the Inter-State company, like hundreds of others, is compelling this "natural monopoly" to recognize the fact that merit alone is the only true foundation and reason for the existence of any business enterprise. It is forced to recognize the fact that a company "of the people, for the people and by the people" is one that its millions of capital is utterly unable to overcome and suppress. It has seen whole exchanges of its own put out of business, and it knows of others marked for a like fate.

Its reference to "water" in the stock of any Independent company must provoke a smile when we think of the hundreds of millions of capitalization of the parent Bell company and its subsidary companies throughout the country. I have before me an article from the pen of Vinton A. Sears, the well-known capitalist of Boston, in which he says: "The policy of the Bell Telephone Company has been to stifle competition and create a monopoly, which was necessary for its existence, owing to the vast liabilities it incurred by selling stock at a nominal price and buying up competitors, regardless of values received." Since the appearance of the articles referred to a number of enterprising brokers have sought to take advantage of the possible timidity of some of the stockholders of the Inter-State company by trying to purchase their stock at a sacrifice.

The quotations of the Cleveland Stock Exchange show that within thirty days of the publication of an article attacking the securities of the Toledo Home Telephone Company in a similar manner, the stock of that company increased in price twenty-four per cent. A letter before me from one of these brokers elicited a reply to the effect that "I have no stock to sell under seventy-five cents. I think anyone would be exceedingly foolish to sell much, if any, under that price. I am a stockholder in three other Independent telephone companies and am thoroughly familiar with every detail of their business, and have no hesitancy in saying that I regard Independent telephone investments as among the safest and most profitable of any of modern times."

James B. Hoge, president of the National Independent Telephone Association, recently compiled a table showing that the percentage of failures among Independent telephone companies during the year 1904 was less than among national banks. You may believe the evidence of your own senses or the words of a discredited "natural monopoly," as you choose.

Very truly yours,

C. B. Cheadle.

Mr. Cheadle has been actively identified with the telephone business for over six years. He is a director in the Inter-State Independent Telephone & Telegraph Company and has been one of the chief factors in financing it. He is also secretary and treasurer of the Tri-City Telephone Company of Clinton, Iowa, a reorganization of which he effected about two years ago, and of which he is secretary and treasurer. Last summer and fall Mr. Cheadle financed a company that has acquired the property of the Lee County Telephone Company of Dixon, Illinois, and is now installing at that place one of the finest plants in the country, the reorganized company being known as the Dixon Home Telephone Company, of which he is secretary. It has been Mr. Cheadle's pleasure to meet many of the leading bankers and financiers of the middle west in the past three years, with whom he has discussed at length all phases of the Independent telephone business from the investor's standpoint. His statements contained in the above letter are made with due deliberation and based upon experiences in active connection with the business itself.

FARMER'S TELEPHONE GETS HIM INTO TROUBLE.

There's one elderly resident of Ogden, says a Rochester, New York, paper, who, although a snug sum of money stands to his credit in the bank, is so stingy that he won't even borrow his neighbor's paper for fear of the wear and tear of his spectacles. Last week the subject of this sketch suffered a periodical attack of rheumatism, but, following his custom, did not call in the country doctor, applying home remedies instead.

Finally the pain drove him almost frantic. A friend mentioned electric treatment. He groaned at the thought of the expense. Desperate, he hit upon a scheme of connecting wires and sponges with the batteries in his telephone, the latter being tolerated only because of economy in saving long trips, and for a time this rural exponent of the life simple met with success with his novel home treatment.

All went well until the worthy man, for a small consideration, tried to treat an impecunious friend similarly afflicted. Then the telephone went broke. Now the home doctor is in a quandary, not daring to tell the telephone company of the break, for fear of being assessed for the electricity or repairs, and his impecunious friend held him up for $5 on being pledged to secrecy. His neighbors are having the first laugh on him in twenty years.

The city council of Atlantic City, New Jersey, has decided that telephone and telegraph wires must be placed underground.

Telephone Construction Practice

H. J. MINHINNICK

CHAPTER III.

TOOLS.

ONE of the chief causes of the industrial supremacy of the American mechanic undoubtedly lies in the fact that our tool-makers furnish him with implements exquisitely adapted to his purpose and of almost endless variety, and one of the first things noticed by foreign visitors is the, to them, extraordinary number of tools which go to make up the equipment of every workman. As might be expected, the makers of construction tools have in nowise lagged behind the procession, and at this time every operation about the installation of a plant has its own special set of tools; in fact, the difficulty lies not so much in obtaining what is required as in choosing from the great variety offered.

CONSTRUCTION CREW WITH POLE-RAISING OUTFIT.

About the only mistake that can be made is purchasing an inferior grade, and unfortunately this mistake is only too common. As a general rule, when a reputable manufacturer makes two or more grades of the same article, quality and price are in strict proportion, and it is the poorest kind of poor judgment to purchase the low grade product and expect good results. This is particularly true in view of the fact that the difference in cost between the very best and the very poorest tools is an extremely small percentage of the investment. This question of tool investment is apt to be more or less of a bugbear around the average exchange, for, of necessity, many of the tools will be practically worthless once the plant is completed. This is especially true of conduit and cable tools, but even in such a case it is true economy to provide a full equipment, for the amount of work done by a certain number of men supplied with a sufficiency of the best appliances is so much greater than the same men can perform with inadequate tools that the additional cost cannot be seriously considered. Herein lies one of the great advantages of the large construction companies, whose tool and instrument account not uncommonly reaches from $5,000 to $10,000, and who can afford to employ the very latest and best appliances on their contracts, as, with them, the prime cost is not so important as the savings effected.

Beginning with conduit tools, we have the square point shovel, the round point shovel, the square spade, the tiling spade, the ordinary pick, the concrete pick, the common dirt rammer, the concrete tamp, the paving rammer, the wheelbarrow, the lanterns, and, where required, the asphalt cutter. Beside these, the tool box should contain a couple of good crowbars, a chopping axe, two hand axes, an 8-inch file, a cold chisel, a hand saw, a hack-saw, two hammers—one nailing and one 2-pound machinist's—a sledge hammer, a monkey wrench, a five-gallon oil can, a supply of extra wicks, two or three stable buckets, a pail and cup for drinking water, a coil of 3-16" cotton line and a box of carpenter's chalk. If asphalt pavement is to be taken up, three or four additional sledges must be included.

The first requisite is a good tool box mounted on trucks, so that it can be moved from point to point as the work progresses. The illustration shows one which has seen two years' service, and is as good as when made. The entire rig cost $20, as follows: The trucks were purchased second-hand from a dealer in agricultural implements for $15; the lumber, labor, hinges and padlocks amounted to $4.25, and a couple of coats of paint accounted for the balance. The box is 8'x4'x4' 6", having ample capacity for

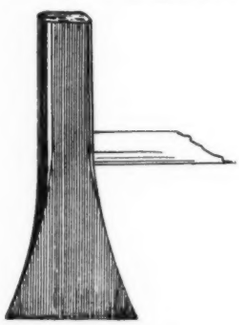
all the tools in use, and the outfit will pay for itself on a single contract in saving of time in receiving and issuing tools daily.

The shovels and spades illustrated are so familiar that no detailed description is required. The round point shovel

SHOVELS.

or the tiling spade is the chief digging implement, the choice depending largely on the quality of the soil. If this be so hard that picking is necessary, the pick and round point shovel form the ideal combination; in moderately hard soil the tiling spade alone is required, and in soft or sandy ground the round point shovel will do the work. The square point shovel is used only in mixing concrete and the square point spade for trimming up the sides and bottom of the trench. In selecting these tools it is the poorest kind of economy to purchase the cheapest that can be had, for a poor shovel or spade will not last through a single job

CONCRETE PICK.



ASPHALT CUTTER.

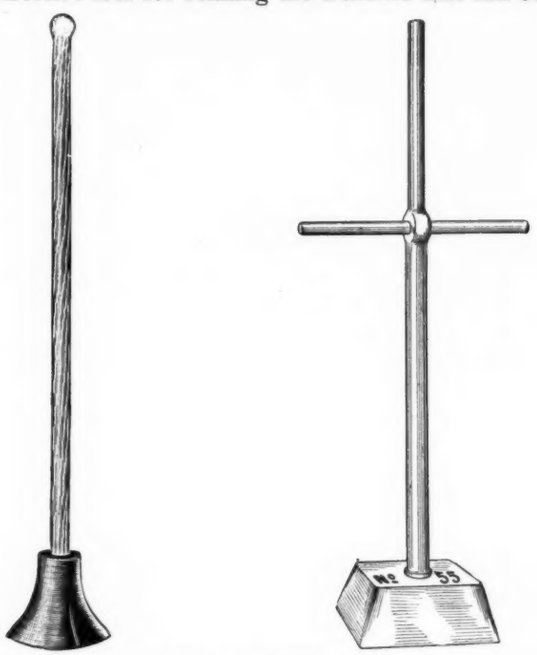
and is utterly worthless when the work is completed, while a good tool will go through three or four contracts before giving out, and even on single plant the loss of time due to dull and bent up digging tools (for a cheap shovel will not keep an edge an hour and either bends or breaks on the slightest provocation) will offset the additional cost of good tools ten times over. The cheapest shovel made costs $6.50 per dozen and the very best can be had for about $10.50, so the possible saving on five or six dozen amounts to practically nothing.

The common pick made of iron with short steel points is an unmitigated nuisance, and should never be used, for, like a cheap shovel, it is a source of continued trouble. The soft iron eye soon breaks out and as soon as the points are gone, which is usually very quickly, it is entirely worthless. The all-steel railroad pick, on the contrary, can be

STEEL TRAY WHEELBARROW.

sharpened over and over again and can be used until worn down to too light a weight to be of further service. The common pick weighs from five to seven pounds, the all-steel from eight to nine; the cost is $3.75 per dozen for the former, $8 for the latter. It should not be forgotten that all picks are sold without handles and these must be ordered separately. A good grade will cost $1.25 per dozen. The concrete pick illustrated is an excellent form of this tool. It is made from solid tool steel, weighs eight pounds and costs about $13 per dozen. A special second growth hickory handle is required, which costs $2 per dozen.

The pear-shaped dirt rammer illustrated is about the most effective tool for refilling the trenches that can be had.



DIRT AND CONCRETE RAMMERS.

Being only six inches in diameter at the bottom and weighing about twenty pounds, it delivers a surprisingly heavy blow and thoroughly compacts any sort of soil. It is furnished with heavy four-foot handles and costs $9 per dozen. The concrete tamp may be had in various sizes and weights; the most commonly used is 8x8 inches and weighs fifteen pounds, and costs $10 per dozen. The paving rammer can be cheaply made by spiking together four pieces of 2x8 plank, three feet long, and boring in a handle. This tamp is intended to be used by two men, and will be found

especially useful in relaying brick or cobblestone pavements. ments.

The steel tray wheelbarrow illustrated has a capacity of from 4½ to five cubic feet of concrete. The tray is made from either fourteen or fifteen gauge steel and the cost ranges from $25 per dozen up. These barrows are always

HANDSAW.

shipped "knocked down" and care must be taken in setting them up to get the several parts properly fitted. Tubular barrows can be had made entirely of steel, but it is questionable if the extra expense (their cost being about $6 each) is justified. It may be said in passing that no tool on the works will repay a little attention more than a wheelbarrow. If given an occasional overhauling, bolts tightened

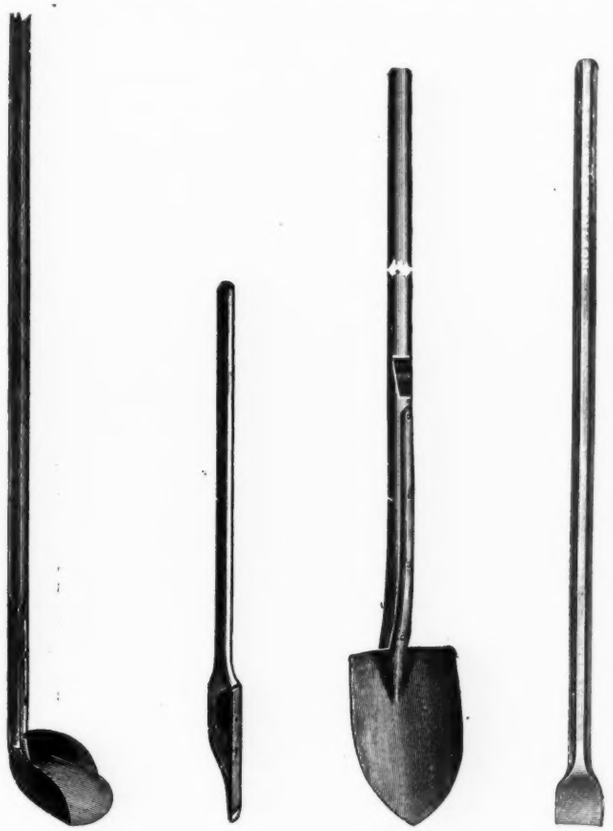
TOOL-BOX ON TRUCKS.

up, etc., it will last almost indefinitely, whereas, if allowed to become rickety, it will go to pieces in short order.

Any good tubular lantern will answer the purposes of conduit construction; in fact, the cheaper the better, for many lanterns will be stolen in any case and possibly a cheap one will present less temptation. Ruby globes should be used along the ditch, white ones at crossings over it. A fair lantern can be had fitted with ruby globes for about $5 per dozen, with white for $4.

The asphalt cutter is made in two shapes, one to be used as an axe, the other to be struck with sledge hammers. The latter is best adapted to telephone work, and consists of a tool steel chisel about four inches on the cutting edge fitted to a handle, and with a very long head, so that it will stand the pounding of the sledges. These cutters cost about $15 per dozen.

Concerning the other tools mentioned it will suffice to say that the crowbars will weigh about thirty pounds each, and the sledges from twelve to fourteen pounds. For spreading concrete the writer has never found anything quite so satisfactory as the common potato hook, which can be had at any hardware store and which is immensely superior to a hoe or rake for this purpose. A good supply of extra handles for all tools should be provided, and it would seem hardly necessary to say that the tools must be kept in good working order, and yet it is no uncommon thing to see a crew attempting to work with dull and broken picks and shovels. Picks should go to the blacksmith the moment they begin to get dull, and shovels and spades (which are always received dull) should be ground and filed before leaving the warehouse and the men should be made to keep them in shape. The coil of cotton line, which should be at least 300 feet long, is used to stretch along the sides

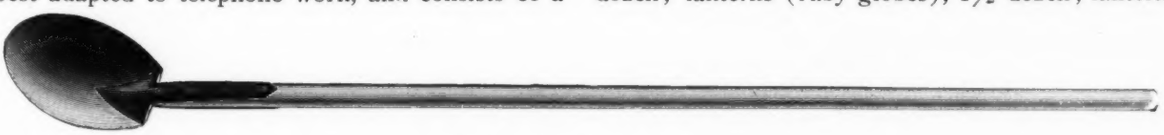


SPOON. LOY. SHOVEL. BAR.

of the trench before beginning the excavation, and the chalk to mark the lines.

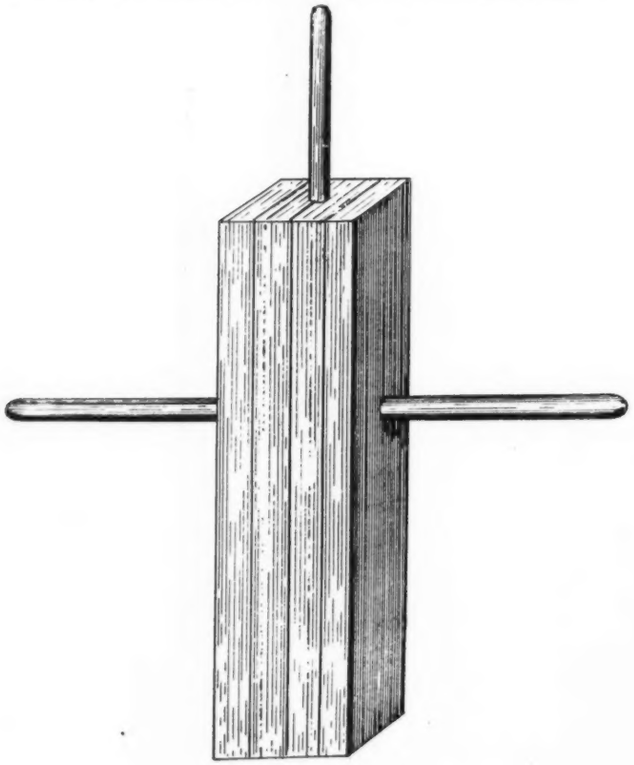
A good outfit for conduit work would consist of at least the following: Round point shovels, 3 dozen; square point shovels, 1 dozen; wheelbarrows, ½ dozen; square spades, ¼ dozen; tiling spades (if required), 2 dozen; picks, 2 dozen; concrete picks, ½ dozen; concrete tamps, 1-6 dozen; common dirt rammers, ½ dozen; paving rammers, ¼ dozen; lanterns (ruby globes), 1½ dozen; lanterns (white globes), ½ dozen; asphalt cutters, ½ dozen; beside the incidental tools mentioned.

For the manholes no additional tools are required, except a mortar box, mixing hoe and several buckets for carrying mortar. The best form of these latter is the heavy wooden stable bucket banded with iron and with an iron rod running across the bottom and up the sides to form the lugs for the bail. One of these will outlast a dozen ordinary pails. Three hundred feet of good garden hose will be required and a reducing coupling which will permit its attachment to a fire plug.



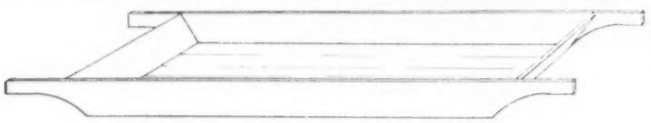
LONG-HANDLED SPADE.

For handling the poles in the yard the following equipment is necessary: Seventy-five feet of one-inch Manila rope, two chopping axes, four hand-axes, four-cant-hooks or peavies, fourteen-inch draw-knives, crosscut handsaws, framing squares, two-inch framing chisels, framing horses, braces, bits 11-16, 9-16 and ½, augers ¾, 1 and 1⅜ inches, five-foot crosscut saw, chalk lines, chalk, tape line, grindstone, oilstone and can of oil, seven-inch double blocks with 125 feet of ⅞-inch rope, snatch block, chains, tool box.



PAVING RAMMER.

Taking these in order the one-inch rope is used in unloading, being thrown around the load of poles to prevent them going off the car too suddenly; the chopping axes to cut the car stakes, trim off rough butts, etc., the hand axes to trim down the knots before the pole is shaved, and the canthooks or peavies to roll the poles into place. The canthook, as illustrated, is too familiar to need further description, but the handle should always be of hickory instead of the usual maple; it is 4½ feet long and 2½ inches in



MORTAR BOX.

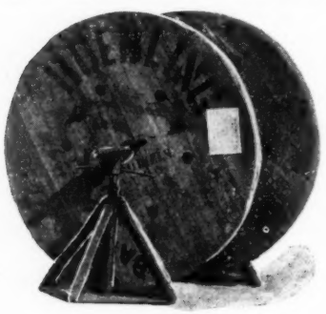
diameter. The peavey differs from the canthook in having a longer handle (5½ feet) and a stout pike point at the end. As it will stand considerably more abuse it is to be preferred. The canthook will cost $9 per dozen, the peavey $13.

No quantities are prefixed to the remaining tools on the list, as the number required will depend entirely on how many men are employed. Each shaver will require a drawknife and handaxe; each framer a handsaw, a framing chisel, two framing squares and a framing horse; each man boring holes, a brace and the appropriate bits, while the remaining tools are for general use. Of the edged tools and bits several of each should be provided in excess of the actual requirement that they may be kept sharp *in the warehouse* and exchanged for dulled tools as the latter come in.

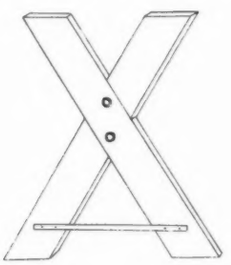
The fourteen-inch drawknife illustrated is made especially strong and heavy and costs $18 per dozen. The several patterns of curved knives sometimes advertised are of no use, as they are all too short to work well on a large pole. The handsaws should have coarse teeth, not more than seven to the inch, and be given a heavy set so as to assure a clearance in the soft cedar; as illustrated they run in length from 20 to 28 inches, 22 being a very convenient size; they cost from $9 per dozen up. A saw filing outfit

DRAW KNIFE.

should be provided at the warehouse, including a filing vise, a set and plenty of files, and all saws should be regularly overhauled at least once a week. The framing squares need be only the cheapest patterns of carpenter's squares, 24 inches on one leg and 17 inches on the other, and require no graduations but feet and inches to eighths. The framing chisels should be of the heaviest procurable patterns and of first quality. They will cost $7.20 per dozen. The framing horses may be made by spiking or bolting two pieces of 2x4 hardwood together, as illustrated, and stiffening the bottom by a cross-arm brace or loop of wire. The braces may be of any standard pattern, and as they require no ratcheting device are inexpensive, costing about $4 per dozen. The bits, however, must be of the very best quality to give good service in cedar. A common bit will stick



CABLE JACKS.



FRAMING HORSE.

and clog in every hole, and even the finest tool must be kept sharp or it will act as badly. The writer has found the pattern known as the "car bit" the most satisfactory, and as this pattern can be had in several lengths it is well suited for the different depths of hole required. The 11-16 inch bit is used for all holes requiring a ⅝-inch bolt, the 9-16 inch for ½-inch bolts, and the ½-inch for steps.

The augers are used for boring the slugs for anchor rods and should have the stocks lengthened out to at least eighteen inches. The five-foot saw is used for cutting up stubs and slugs, and, if desired, for roofing the poles. The seven-inch blocks and snatch block are for loading the

CANT HOOK.

poles on the wagons by means of a shear pole, and the chains for hauling the poles into position and loading. Three or four regular six-foot logging chains, with ring in one end and hook in the other, will answer every requirement. The tool box will be a fixture in the pole yard

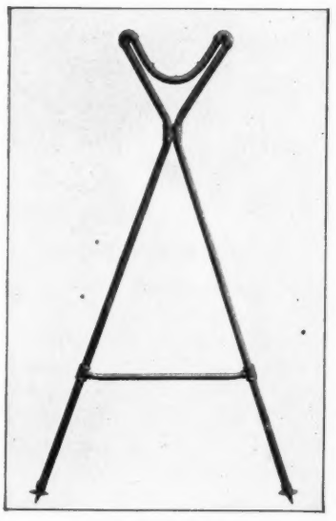
and should be of ample size to hold all the tools and fitted with a good padlock; a rack should run along one side to hold all the smaller tools and preserve them from injury.

DIGGING AND SETTING TOOLS.

For hole digging the time-honored equipment consists of the long-handled shovel, the bar and the spoon, and it is doubtful if any other implements will be found to take their places. Many attempts have been made in this direction, but without success, and one cannot too carefully avoid the temptation to try some of the plausible looking devices occasionally advertised, as every one of them so far produced is a snare and a delusion. Modern practice eliminates both spoon and bar, except in extremely hard and strong ground, and the only tool commonly used is the shovel. If the ground be too hard for shovel alone, but free from stones, the loy is lighter and a little more effective than the bar. In stony soil, however, bar and spoon are both required. As illustrated, the shovels are made of solid crucible steel, extra heavy, fitted with 8-foot handles and 22-inch strap. These cost $14. The best spoon is the Western Union pattern, as illustrated; it is also eight feet long with 22-inch strap, and costs $13 per dozen; as with the shovels a cheaper pattern with short strap can be had for $12, but should not be considered. The bars are made from 1⅛-inch octagon steel eight feet long, with a chisel point at one end and a sharp point at the other; they weight about 25 pounds and cost $16 per dozen. The loy is likewise eight feet long, has a heavy two-inch handle, and is fitted with a crucible steel blade; the price is $18 per dozen.

TAMPING BAR.

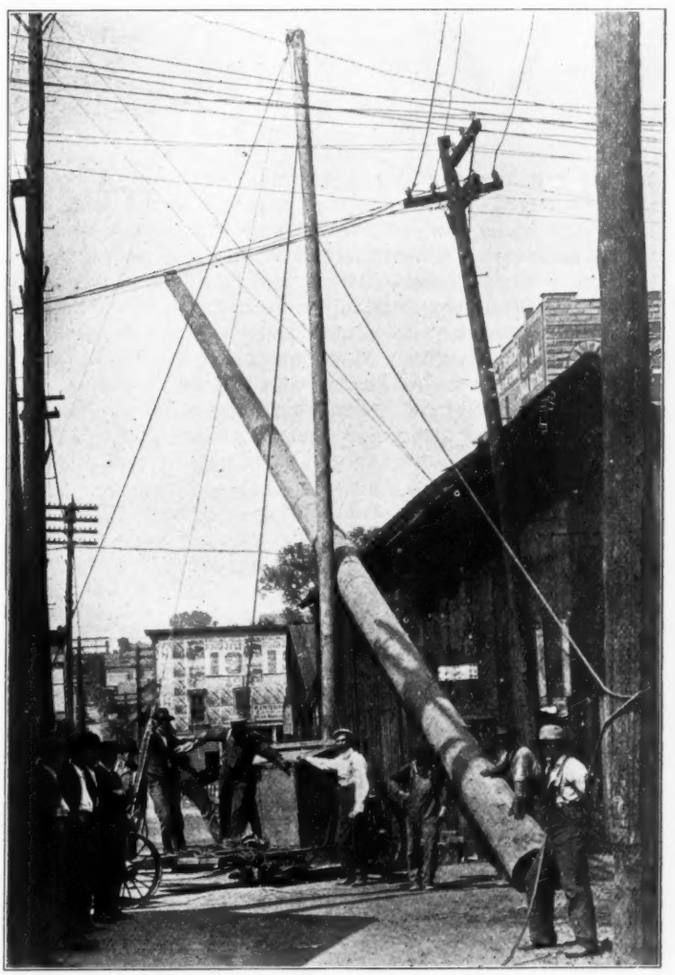
WOODEN JENNEY.



IRON JENNEY.

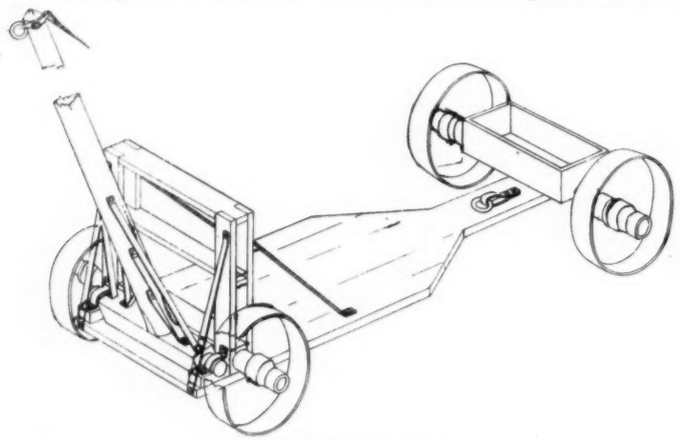
If but few poles are to be set the old method of raising by pikes and a jenney may be adopted; the pike poles had best be made locally, as those carried by dealers are hardly good enough for the purpose; any carpenter will dress them by hand from clear pine or fir for little more than the ready-made article will cost, and the best screw points can be had for $2 per dozen, including ferrules. Defective pikes have been responsible for many nasty and expensive accidents and great care should be taken in the selection of the timber. Any knotty or cross-grained sticks should be rejected and only clear and perfectly straight-grained lumber used. The pikes should be at least two inches in diameter (2½ inches is better), dressed out and planed perfectly round and smooth, with no taper at either end, and treated with several coats of boiled linseed oil. The points may be had either to drive or screw in (in either case the ferrule will be driven on first to avoid splitting), and there is little choice between the two methods. There should be at least three lengths—12, 14 and 16 feet—and about the same number of each length. Several forms of guarded pikes have been advertised, but none of them possess any features of merit to recommend them or warrant the additional expense.

The common pole jenney, as illustrated, is made from selected hardwood timber, and is either rigid or made to fold as desired; the iron work is heavy and well adapted to the purposes intended and the length may be from six to nine feet. A seven-foot length is generally most desirable, for if the jenney be longer the pole has to be lifted too high before it can be set in position. Another jenney is obtainable, made entirely from iron tubing, which is lighter and stronger than the one illustrated; so far as the writer can ascertain this form is made only by Hallett & Company



POLE DERRICK IN ACTION.

of Chicago. The wooden jenney will cost for the seven-foot length $6.50, the iron one $8. Modern city practice has entirely done away with this method of pole raising, which requires a large number of men and involves an immense quantity of the most arduous labor and no inconsiderable danger to life and property. For the old-time crew of ten or twelve men, setting not to exceed an average of 30 poles per day, there is substituted the pole derrick, which, with four men and a team, will set with ease from 80 to 100 poles in the same time. The derrick possesses the



POLE DERRICK DETAIL.

further advantage that a pole can be set almost as easily through a tangle of obstructing wires as in the open, for it is always under perfect control and can be swung at any angle necessary. The illustration shows a pole going up through a mass of electric light and telephone wires, which would be absolutely impassable by any other method, and yet this particular pole was raised without cutting or breaking a single wire. Most companies would like to own a derrick of this style, but fear the expense involved. The wagon illustrated cost complete $89.27, and can be made anywhere at no greater expense. The items were as follows:

Trucks (taken from a worn out threshing machine)	$10.00
Hickory lumber for bed	21.00
Blacksmith	34.00
Pole (35′) for boom	3.75
Tongue	5.00
Blocks	5.97
Tool box	2.25
Rope	7.30
Total	$89.27

Another useful tool in city work is a small "dolly" for wheeling heavy poles into place. Not infrequently, especially in the business district, the poles must be unloaded in

HAVEN CLAMP.

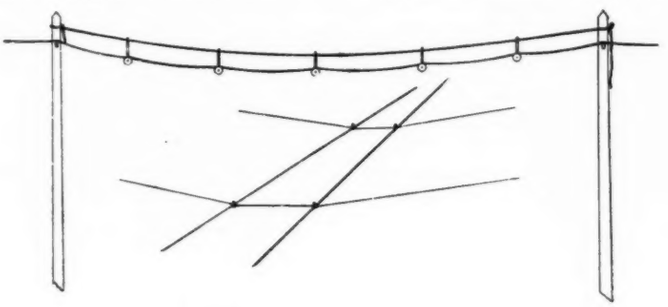
JACK STRAP HOOK.

the street and it is quite a task to move them to place. This little truck saves all this trouble, and as it can be made for $8 or $10 it will soon pay for itself. The illustration shows the details of its construction, as also its use, very plainly.

The derrick crew merely drop the pole in the hole and a setting crew straighten it up and tamp it in position. The only tools they will require beside the pikes are the tamping bars and shovels. The tamps, as illustrated, are eight feet long, made of selected hardwood, 1x4 inches at the tamping end, which is heavily shod with steel and cost $15 per dozen. Many foremen make the mistake of using tamping bars too large—they forget that the secret of all good tamping is repeated blows with a small bar.

MESSENGER AND GUYING TOOLS.

In stringing messenger wires and setting guys the only special tools required are the grips, or come-alongs. The blocks, ropes and wrenches will be mentioned subsequently. For light work, such as setting guys, the Haven clamp has proved the most efficient, and is practically universally used. It is made in two sizes, one for strand up to ⅜ inch, the other up to ½ inch. The illustration shows the eccentric principle on which it works. For the heavy pulls necessary to stretch long lengths of heavy messenger something more substantial is required, and the second illustration shows a clamp as adapted by the writer from an old and somewhat inefficient form. This clamp has never failed or sprung, and, it is believed, solves the problem of heavy pulls. As will be seen, there are no bolts to bend or spring out of shape (which is the great fault of all cam devices) and the harder the pull the tighter the grip, beside which there is absolutely no possibility of nicking or crushing the strand. The entire tool is made of steel and the dimensions given are those which have proved most desirable in practice. The wedges are prevented from slipping out by a steel ball set in the wedge, which engages a slot cut in the main forging. Nice workmanship is required to secure the parallelism of the jaws at all points, for if either end be cut of line there is danger of cutting the strand. The tool may be had from the Dicke Tool Company of Downers Grove, Illinois, who are the sole manufacturers. The common trolley clamp, which consists of two steel plates fastened together with machine screws, is an efficient tool, but



HAND LINE ON HAY CARRIER PULLEYS.

requires too much time to place in position and remove.

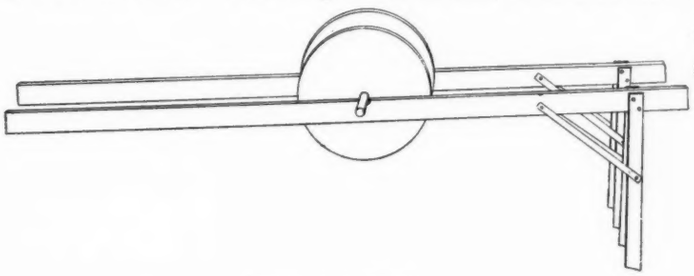
Mention must be made of one other little appliance, which is seldom seen, but which is most useful in carrying messengers across high tension circuits, railway tracks, trolleys, or other dangerous obstacles. This is the common block, known to the hardware trade as the "hay carrier pulley." Four or five of these strung on a hand line from pole to pole will effectually avoid the possibility of accident from sagging messengers, and it is advised that 10 or 15 form part of the equipment of every company. Their cost is practically nothing (15 cents each) and their use, where indicated, will avoid expensive accidents.

For supporting the reels of strand a pair of horses of the pattern illustrated must be provided. These are made of hardwood 4x4-inch timbers, with stout and well braced legs, and when the shaft is run through the reel it can readily be rolled into position. For some reason best known to themselves, but which certainly does not bear the imprint of common sense, manufacturers ship all heavy strand on reels with a square hole through the center. This necessitates the making of a square block to fit the reel with a hole bored for the shaft, which latter should be at least five feet long and made from 1½-inch steel. A piece of suitable shafting can be picked up at any junk dealer's, for 25 or 50 cents. In this connection it will not be out of place to suggest that a junk yard affords many opportuni-

ties to save money on tools and special material. One can always find angle and channel irons, chains, shafts, wheels and such things there at a small fraction of their original cost, and so effect considerable savings.

CABLE TOOLS.

The old method of stringing cable by placing the hangers on the cable as it leaves the reel and pulling "on the hooks" with a lineman at every pole to "pass the hook" is fortunately about obsolete. Modern practice in this, as in all other

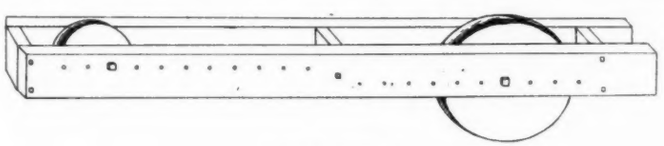


STRAND HORSES.

matters, requires faster work with fewer men. Two general schemes are in vogue, in one of which the cable is still pulled on the hooks, but instead of requiring a man to pass them around the pole they are "switched" around mechanically; in the other the hangers are not put on till the cable is in position, it being supported in the meantime by trolleys attached to the messenger. Each of these systems has features of merit, and each will be fully discussed in

CABLE ROPE AND REEL.

a subsequent chapter on cables. For pulling, many devices are in use, including man-power, horse-power and electric, steam and gasoline machines, and these will be discussed and illustrated in the same chapter. All methods, however, require some way of supporting the reel and, for underground work, a skid and sheaves. The most efficient appliance for the former purpose is undoubtedly a pair of jack screws, and the illustration shows a most effective form.



CABLE SKIDS.

These will cost $15 per pair, and a two-inch shaft about six feet long will also be required, which usually can be obtained from any junk dealer for from 50 cents to a dollar. Another method which is largely in favor is to employ a pair of wheels (the axle being a piece of shafting) sufficiently high to permit the largest reel to clear the ground when supported on the shaft. As the cable manufacturers use reels with a radius of three feet for the heavier cables, it follows that the wheels must be at least seven feet high, and their cost will equal that of the jacks, to say nothing of the extra labor required to get the reels in position. The only argument in their favor is that the reels can be taken directly from the warehouse to where they are required, but this amounts to absolutly nothing, for, if carried into practice, it would mean a trip to the warehouse between every pull. If, however, for any cause this or the following method be adopted, a pair of inclined planes should be provided (best made by sawing a 12″x12″x6′ timber diagonally), up which the reels can be rolled till the shaft can be inserted. If it is preferred to spend money on unnecessary labor a pair of heavy horses may be made 3½ feet high at one end and two feet at the other, about five feet long. These must be framed from heavy timbers and well braced, as they will have weights as high as 4,000 pounds to carry. At each six inches of their length a depression to receive

CABLE WHEELS.

the shaft must be made, and in this way any sized reel can be accommodated. The writer would, however, earnestly advise that on any plant which will require more than ten or a dozen reels of cable the jacks be purchased, for they will pay for themselves almost every day they are used. The wheels or horses cannot well be used on soft or rough ground, as it is essential that the shaft be level while the reel is turning, whereas the jacks can be adjusted in any position and under almost any circumstances. even when the reel is in motion.

The underground skids are made from two pieces of 3″x8″ oak or hickory well bolted together and about 12 feet long. The detail drawing shows the method of con-

PAY-OUT REEL

struction so completely that further description is unnecessary. The lower sheave should be as large as possible (generally 18 or 20 inches in diameter), made from three thicknesses of 1-inch oak laid up with the grain crossing, so as to avoid the danger of splitting, and with a very shallow groove. This admits pulling a good length of slack into the manhole, as the heaviest cables can be drawn at least part way around the sheave with complete safety. The sheave will, of course, be well bushed for a ¾-inch steel bolt.

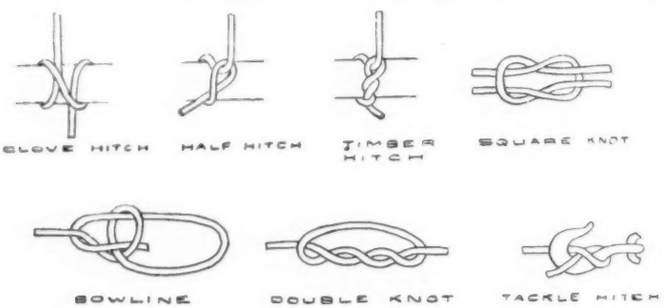
INSIDE WIRING TOOLS.

As inside wiremen are generally required to furnish their own tools this paragraph may be out of place and the subject may be dismissed by saying that each wireman's kit should contain a common ratchet brace with a supply of

bits, a corner brace of the usual "Amidon" pattern, several "electrician's bits" of different lengths and sizes, a screw-driver, a hammer, one or two brick drills, a roll of tape, solder, flux and a gasoline or alcohol torch. The bits, drills, tape, flux, solder and torches are supplied by the company. The alcohol torch, as illustrated, is much more desirable than the ordinary gasoline blow torch, as there is less danger of damage to walls and wall paper from its use. As the soldering required is very little, and that on small wire and in sheltered places, a common candle will give ample heat and it is the writer's practice to supply these to the inside wiremen instead of torches. It is believed that a workman will always take time to light a candle to make his joint while he might be disposed to neglect the soldering if he had to wait for a gasoline torch to light.

WIRE TOOLS.

Of these the only ones needing special mention are the reels, running boards and jack straps. The ropes, blocks, etc., will be referred to in the following paragraph. The common pay-out reel, as illustrated, is too well known to need description. It may be mounted on the customary barrow, as shown, or five reels may be mounted on a single plank either on the ground or on a wagon. If the latter method be preferred there must be two sets of five reels each provided, so that ten wires may be strung at once. The wagon has the great advantage of insulating the reel attendants from the ground and so avoiding the possibility of accident from high potential crosses, and, if the reels be



DIFFERENT STYLES OF KNOTS.

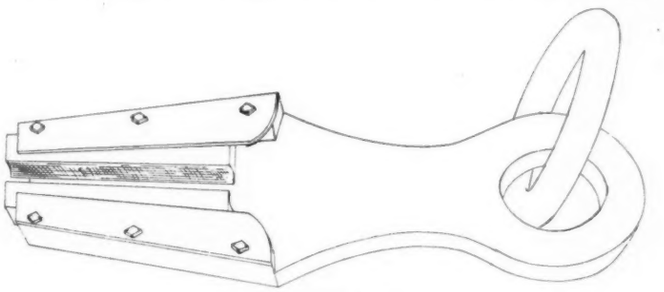
used on the ground, planks should be provided for the attendants to stand on. It is also good practice to ground the reel itself very thoroughly, which can be readily done by running an iron strap from the outside circle to the spindle and a wire from the latter to one of the iron legs. However, the attendants should never be allowed to stand on the bare ground; the writer has seen several severe accidents caused by neglect of this simple precaution, and a few dollars spent in protecting the workmen so far as possible from high tension currents constitute a big insurance against possible heavy damages for death or injury.

The running-board as generally made consists of a triangular piece of iron with a ring and swivel at the apex to attach the hauling rope and with eleven holes bored in the base to receive the wires. A piece of rope should be attached to one end of the base to keep that end always down and so prevent the triangle turning over and tangling up the wires. The illustration shows the most customary form very clearly. If desired, snaps may be used instead of attaching the wires directly to the base, so that in passing a pole the five wires on the side of the pole opposite the hauling rope may be quickly placed in their proper places. On new work, however, all circuits are generally pulled over the top arm and afterward dropped to position so there is no necessity for taking off any of the wires. The eleventh hole is provided to pull through an extra wire by which the hauling rope may be drawn back when the pull is completed; it is of no use unless a very long rope be used, except where a number of short pulls are to be made.

The jack strap, as illustrated, is the most popular device for taking up slack and when fitted at the one end with a hook to pass around the pin or over the arm, and with a Buffalo grip or something similar at the other, it makes a most excellent tool. Several other slack pulling devices are shown in supply house catalogues, but the jack strap is in such almost universal use that they need not be further mentioned.

ROPES, BLOCKS, ETC.

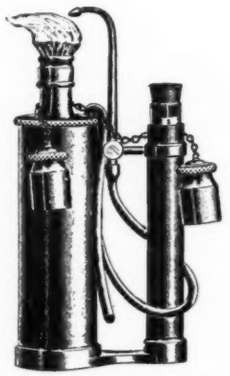
For all construction purposes the very best quality of long fiber manila rope is required and no other should ever be considered, nor should a rope be continued in heavy



MESSENGER GRIP.

service after it shows the least sign of distress or weakness. It must be remembered that no other class of work is harder on rope than line construction and that few other forms of service involve such danger to life and property. In hoisting poles, stretching messenger or pulling cables, there is a distinct element of danger and one little accident would cost more than all the new ropes that could possibly be used. Beside all this a good rope costs but little more than a poor one and will give double and treble the service, so from every standpoint the high grade product is to be preferred.

Blocks should always be of steel with graphite bearings, as these require no oiling and last indefinitely. The graphite is moulded into grooves cut in the bushing of the block, and as the bushing wears down the graphite wears with it and keeps the shaft constantly lubricated. All blocks should be



ALCOHOL BLOW-TORCH.

RUNNING BOARDS.

furnished with hooks at each end and each hook should have a closing link to prevent its straightening under heavy strains. For light service wooden blocks may be employed, and on account of their lesser weight are to be preferred. The following table shows the several sizes of blocks in most common use and the ropes they will accommodate. It will be noticed that the block is measured by the *length of*

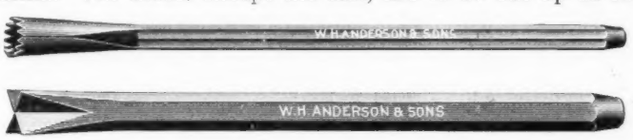
the shell, not by the *diameter of the sheave*, as is often supposed.

Length Shell.	Diameter Rope.
4	½
5	⅝
6	¾
7	⅞
8	1
9	1⅛
10	1¼
12	1⅜

The following list shows about the correct equipment of blocks and lines: For the pole derrick, one pair eight-inch, one pair six-inch double steel blocks, and two eight-inch snatch blocks; for the pole yard, one pair eight-inch double steel blocks, one eight-inch snatch block; for guying, one pair six-inch wooden triple blocks, one pair six-inch double wooden blocks. The same blocks can be used for stringing messenger and aerial cable. For general light work three or four pairs of four-inch double wooden blocks may be used.

LINES.

For hand lines, 1,000 feet of ½-inch Manila, 500 feet of ½-inch cotton; for general heavy lifting, 1,000 feet of one-inch Manila; running lines for wire pulling, 3,000 feet of ⅝-inch Manila; for cable hauling, 1,000 feet of 1¼-inch Manila. All these, except the last, are to be cut up as required, the running lines being preferably about 1,000 feet each in length.



BRICK DRILLS.

Foremen must insist that ropes be kept neatly coiled, for if allowed to become tangled, unlimited time will be wasted. When preparing to move a line with blocks attached the fall should be drawn through the blocks till the latter are about five feet apart, a half hitch thrown around the lines midway between the blocks and the fall neatly coiled around them as they lie on the ground, when a final double hitch around the whole completes the operation and no possibility of a tangle is left. In taking rope from the coil the latter should be mounted on a reel or rolled along the ground so the line will not become kinked. The cable hauling rope is the heaviest and most expensive used and should not be coiled up like an ordinary line, but for its accommodation a substantial reel should be made by taking a pair of old wagon wheels and fitting a shaft to them. The illustration shows the construction plainly. A reel of this kind can be made for $3 or $4 and will save its value many times, both in saving of time and also in lessening the wear on the rope and preventing kinking. As many linemen are not familiar with the best forms of knots a few of the most useful are here illustrated.

MISCELLANEOUS TOOLS.

For general use there will be required a good supply of hand axes, wrenches and screwdrivers and a couple of pairs of bolt clippers. The hand axes are of the pattern known to the trade as "linemen's broad hatchets," and may be had in various sizes from 4½ to seven inches, this measurement being the width of the blade. There are two patterns in common use, in one of which side of the blade is flat and the other tapered, in the other both sides are tapered. The writer has found that most linemen prefer the latter pattern, claiming that the former has a tendency to turn in the hand when used as a hammer. The most generally useful size is the six-inch.

Wrenches are divided into two classes—those with adjustable and those with fixed jaws. Of the former the common monkey-wrench is the best known and most commonly used. These may be had from six-inch to twenty-four-inch lengths and at all prices according to quality. Half a dozen eight-inch wrenches of this pattern will be an ample supply, and will cost for a good quality $5 per dozen. Of the second class—those with fixed jaws—the variety is endless, but to avoid multiplication of tools the writer would advise that a few "S" wrenches with hexagonal jaws made to fit a ⅜-inch Crosby nut at one end and a ½-inch at the other, together with three or four lag screw wrenches of the common pattern, are all that are required. The former can perhaps be best made locally, and the writer has had good success with wrenches of this pattern forged from an old rasp, which any good blacksmith will make for 50 cents each. The lag screw wrenches are too well known to require description.

The bolt clippers are of the standard "easy" pattern, which will cut up bolts to and including ⅝-inch. They are also useful for cutting strand and other heavy wires.

In conclusion, all tools should be plainly marked with the company's name or initials. Wooden handles may be branded with a burning iron—wheelbarrows and tool boxes stenciled, and steel and iron tools stamped with a steel die. Good tools mean good, fast work, but the very best appliances will become useless without proper care, and it should be part of the city foreman's duty to inspect all tools at least once a week and to see that they are kept in absolute repair.

TELEPHONE WAR IN CUMBERLAND.

A telephone war is about to be waged in Cumberland and vicinity between the Western Maryland Telephone Company, a home concern, and the Chesapeake & Potomac (Bell) Telephone Company of Baltimore. The latter company once had a very strong hold in that vicinity, and for a time it was understood that the company would reduce its rates to meet the demand for a cheaper telephone service. The rates were $36 a year for business telephones and $24 a year for residence telephones. The rates were not reduced, however, and a franchise was granted the Western Maryland Telephone Company, which began service in the Cumberland territory about two years ago and now covers the entire county, with about 1,900 telephones in service, beside recently making connections with Baltimore, Pittsburg and other cities east and west.

The Chesapeake & Potomac Company has now reduced its rates to those charged by the home concern—$24 a year for business telephones and $18 a year for residence telephones—has shipped a large number of new instruments to its office in Cumberland, and will at once put canvassers into the field in an attempt to build up the list of subscribers. The home concern, it is stated on good authority, was for a time in communication with the Chesapeake & Potomac Telephone Company with a view to taking over the latter's list of subscribers in Cumberland and vicinity and working its toll business over the lines of the Chesapeake & Potomac Telephone Company and its connections, but for some reason these negotiations fell through, and the connections were made to other cities over lines owned by Independent companies, the connection to Baltimore and the east having just been completed.

A telephone was the only means the family of Henry Kohl, near Waterville, had of communicating with the outside world for sixty days. Smallpox broke out in the family and the house was quarantined. The manager of the Citizens' Telephone Company put up an instrument on a tree in the yard and members of the family who were able would stand there and talk with friends. Mr. Kohl also dictated letters over the telephone to those living at a distance.

Conventions of Independents

IOWA INDEPENDENTS HOLD ROUSING CONVENTION.

IOWA Independents, who are among the foremost in the country in the matter of aggressiveness and enterprise, and who have covered the Hawkeye state with a network of Independent lines, held their ninth annual convention in Des Moines on March 14, 15 and 16. The Iowa association is one of the strongest in the United States, and is not only a power in its own territory, but throughout the entire west as well, and its example has been one of the brightest features in the great Independent movement. The Des Moines convention was largely attended and is declared by those present to have been the most interesting ever held in the state. Not a few telephone manufacturing and supply houses made exhibits at the Chamberlain hotel—the convention headquarters—the entire fourth floor of that hotel, in fact, being given over to this instructive feature of the meeting. The displays, without exception, were highly creditable and attracted much attention and favorable comment.

GROUP OF DELEGATES TO IOWA INDEPENDENT TELEPHONE CONVENTION.

The first session was held on Tuesday afternoon in the club-rooms at the Chamberlain and was presided over by J. C. Sullivan of Creston, president of the association. After the preliminary work of organization and the appointment of a committee on credentials, President Sullivan delivered his annual address, which was in part as follows:

The past year has been a very prosperous one with the Independent telephone companies of the United States, and especially of Iowa, which has increased its number of miles of wire from 14,000 miles in 1903 to 49,500 in 1904, and many states have increased their lines in proportion. In Kansas, where every man wants a square deal,, the governor and both houses of the legislature, not only want a chance to talk at a reasonably low cost, but want the people to have the benefit of their cheap oil. If our national legislature would only allow us to have Independent telephones in our postoffices we would at least be pleased, and I think our president, Theodore Roosevelt, will allow us as soon as his attention is called to the fact, that Independent telephones are not allowed in any of those buildings in the United States.

It would be a grand thing if congress would take the regulation of telephone rates under the interstate commerce law, as well as railroad rates. The cost of a three-minute talk from Iowa to Chicago is $2.25, and to New York, $7, which is unreasonable; 50 cents to Chicago and $1 to New York would be sufficient to pay a good dividend on the investment, if not watered too heavily. Another reason why I would like to see the telephone companies regulated by the United States railroad commissioners is that they could compel the companies handling interstate messages to build lines suitable to the amount of business required of them, and compel companies to extend their lines to connect with other

lines, but not with lines where it would destroy competition. If this cannot be done, the state association should adopt rules that would give progressive companies the right to build through the territory of any company refusing to build first-class copper lines, and upon said company's refusal to do so, the association could order the companies on both sides to build the line lacking in efficiency.

Our state association should make new laws governing our associates, for the reason that we have some members who pay no attention to the rules and go into their neighbors' territory without any governing board and build in that territory, to the detriment of a fellow associate. I was one of a committee on arbitration appointed to settle a difficulty between two companies where the two could have easily gotten together, but the aggressor would not submit to the rulings and went on damaging his neighbor's business. We should have every member give a bond in some surety company or certified check and forfeit the same if the rulings of the board of arbitration were not complied with, but subject to an appeal to the state court; this would give our association more earnestness than it has now. I hope something will be done along this line to settle such matters in a businesslike manner.

In the last year we have succeeded in getting the citizens of Council Bluffs to see the necessity of having connections with the Independent companies of the state, and after three meetings with the business men of that city we have been successful in getting a franchise to be submitted to the voters of the city at the election to be held on the 27th of this month, and there is no doubt in my mind but it will carry, although the Bell company is trying to make it appear that it will cause the people to use two telephones instead of one; but by commencing with good construction and a suitable switchboard for a city of that size, the people will need but one telephone, and I have every reason to believe that the people of Council Bluffs will be perfectly satisfied with one telephone company, and that operated by home people.

If the telephone business were as far advanced and the results known, when the Mutual Telephone Company of the city of Des Moines installed their plant, as it is to-day, the people would be perfectly satisfied with one telephone, but the business was a venture, with liability of a litigation over patents and the uncertainties of the amount of business obtainable, and which overtaxed the style of switchboard first installed, necessitating a transfer system, which so easily gets out of order as compared with the modern multiple board now installed. With the thousands of feet of new cable and fine building suitable for the transaction of an up-to-date telephone business, all the associates of the Des Moines Mutual Telephone Company look forward with pride to the new plant to honor the name of the Mutual and Independent companies of the great state of Iowa.

The Independent telephone companies of the state of Iowa now number more than 1,100 and in the United States about 8,000, with 2,500,000 telephones at an expenditure of $200,000,000, and within the last year investment and bonding companies are offering and are taking bonds issued by Independent companies, and they are among the safest securities offered. They make more money when other business is dull than when it is good, for the reason that it is cheaper to ask a customer over the telephone if he is ready to place an order than to pay the expense of sending an agent to solicit the business. There is no reason why any telephone company cannot pay a dividend unless its capitalization is too small, and the earnings have to be put into extensions.

The New York Herald of January 9, giving the people of New York City an idea of what they are paying for telephones compared with other cities where the Independent companies are allowed to do business, stated that the cost of a telephone for offices and business is $2.43 for 5,000 calls, or sixteen calls per day, and three cents per call for all over that number.

Outside of the reading of the annual reports of the officers of the association, which were most encouraging, little other business was accomplished at this session. In the evening an executive session was held, to which only the managers of active companies were admitted. Its purpose was to effect a closer co-operation among the Independent lines.

Wednesday forenoon's session was characterized by a heated debate over a paper which was read by C. A. Hollis of Hudson, "The Relations That Should Exist Between Farmers' Mutuals and Other Independent Telephone Companies." Various methods of dealing with the farm lines were advocated. Four or five different systems have been employed thus far. In some localities the farmers own their own lines to the city limits and then pay a stipulated annual fee for the services of the city exchange in handling their business. In other places the city company owns the lines, extending their own system to the residences of the farmers and charge a monthly or yearly rental in the same manner as city patrons are charged. In some places the farmers are first required to become stockholders in the city company and in others the farmers maintain independent switchboards in the towns, having no connection with the local exchanges. Each of these plans had its champions and none seemed to be most in favor but the theme was prolific of warm and elaborate treatment by the delegates who participated in the debate.

C. H. Judson of Council Bluffs, who at present is superintending the construction of the new Mutual telephone system in Des Moines, delivered an address on "The Old Way and the New," which met with much favor and showed the wide difference between the ancient efforts of telephone builders and the present perfected methods of telephony. Mr. Judson said in part:

To those of us who have watched, as most of us have, the progress of the art of telephony for more than twenty-five years, the surprising fact is that the greatest advancement has been made within the last five years of that period. For twenty years or more the development of construction methods changed only as the exigencies of the work demanded changes, and these changes were made grudgingly and often only as congestion and expansion forced the old methods out of use. The first telephone men were, very naturally, old telegraph men, telephony being merely a form of transmission of intelligence but slightly differentiated from telegraphy. The methods of the telegraph companies were adopted, telephone switches were molded after the telegraph boards, and telephone lines were built precisely as telegraph lines had been built for thirty years before. Twenty-five years ago, in the state of Iowa at least, one telephone plant existed in which not a single cell of local battery was used, and it was a practical operating plant without a single magneto generator.

The idea of the man who builds to-day is: First, give the best service; second, give the least possible trouble; third, reduce depreciation to a minimum. Conditioned always on the income and the growth. When Independent telephony began scientific construction was not aimed at. It was so easy to set a few poles, string a little wire and hook up a lot of telephones that quality was sacrificed to speed and temporary building was the result, but it must be admitted that the rapid growth of the movement is largely due to the facility with which this rapid work was done. But now the period of baby clothes is done; the child is assuming the strength and proportions of a man and must be outfitted and equipped for a man's serious life and the work of the skilled outfitter must take the place of the home made garments of infancy.

The Independent movement is popular for the one great reason that Independent exchanges are managed at home, and usually owned at home, and no alien corporation, however wealthy, can compete with such conditions. And with the best construction, the best equipment and the best management who shall be able to prevail against us?

We don't expect to have perfection anywhere along the line, although we all dream of the perfect telephone system, but we will attain as nearly to it as human invention and skill can bring us and thus leave the enemy no weapon for which we have not a match. May we easily hope to out measure swords with him, for the cunning of our artisans is already taxing his energies and the ingenuity of our inventors giving them many sleepless nights. The army of the Independents no longer follows the beaten path of its senile predecessor, but young and lusty and full of fresh blood, it has hewn its own path through the wilderness and inscribed upon its banner of victory, "I lead. Let him who follows hasten."

"A Generator Call, Lamp Line Board" was the topic assigned to Oscar Knell of Perry. His paper had the undivided attention of his hearers and the ensuing discussion occupied the remainder of the forenoon.

At the afternoon session two very interesting papers were read—"The Science of Modern Business Building," by W. H. Barth of the Sheldon School of Scientific Salesmanship, and "Magneto Multiple vs. Central Energy Multiple Boards for Small or Moderate Sized Exchanges," by J. M. Plaister of Fort Dodge.

The Thursday forenoon session was one of the most interesting of the convention. J. E. Shoemaker of Waterloo read a paper on "The Development of the Toll Business and the Checking of Tolls." N. T. Guernsey of Des Moines also discussed "The Iowa Assessment Law."

The following officers were elected for the ensuing year:

President, S. S. Lechty, Vinton; vice-president, P. C. Holdoegel, Rockwell City; secretary-treasurer, Charles C. Deering, Boone. Executive Committee—J. C. Sullivan,

Creston; George M. Bandy, Des Moines; J. C. Thorne, Fairfield; J. S. Bellamy, Knoxville.

In the afternoon a visit was paid by the delegates to the new exchange of the Mutual Telephone Company, and in the evening a banquet was held at the Chamberlain, a decidedly enjoyable affair and a fitting finale to one of the best Independent telephone conventions ever held in the west.

* * *

OHIO INDEPENDENTS HOLD CONVENTION.

Ohio being the home of James B. Hoge, president of the national wing of the great National-Interstate Independent Telephone Association, and likewise having within its borders some of the most prominent Independent workers in the United States, it naturally follows that when a convention is held in that state it will be a rouser in all the name implies, Ohio's admitted leadership in the Independent movement and its excellent organization giving it a place at the head of the procession. TELEPHONY regrets that it is unable in this issue to give a detailed report of the proceedings of the annual state convention, held at Columbus, on Thursday, March 30. A report received just as this paper is going to press states that the attendance is unusually large, the programme intensely interesting, the exhibits excellent and the enthusiasm on all hands unbounded, which is just what might have been expected at a convention of Buckeyes.

One of the subjects that came up for general discussion was that of means of developing the Independent telephone business of Ohio to a still higher standard. As is well known, Ohio is better organized by the Independents than any other state in the Union and other states are looking to Ohio for action. Frank L. Beam of Columbus is president of the association and James B. Hoge of Cleveland, president of the National association, is one of the vice-presidents.

A banquet marked the close of the convention, at which some of the best-known after-dinner speakers in the state responded to toasts.

* * *

CONVENTION OF MICHIGAN INDEPENDENTS.

The fifth annual convention of the Michigan Independent Telephone Association, which was held at Battle Creek, February 23 and 24, was declared by all those present to have been the most successful and most profitable meeting ever held by that organization. In point of attendance, exhibits, programme, entertainment and interest manifested in the proceedings the convention was all that could have been desired. Fully 100 delegates participated in the various sessions and more than a score of thriving Independent companies, having exchanges in half a hundred cities and towns, were represented. The convention headquarters were at the Post Tavern, but the sessions were held in Knights of Pythias Hall.

On Thursday afternoon at 2:30 o'clock President E. B. Fisher of Grand Rapids called the convention to order, following which Mayor C. W. Clapp delivered a most pleasing address of welcome, as follows:

Gentlemen:—The city of Battle Creek with a population of about 25,000, with its great institutions, its many industries, where the busy hum of working life is continuous, with a citizenship loyal to the city's best interest, welcomes the annual meeting of the Michigan Independent Telephone Association. The word "Independent" flying at the mast head of any business enterprise marks it as one deserving the support and patronage of a people not subservient in either feeling or action. The automatic system inaugurated here at an expense of $200,000 gives secrecy in communication and rapidity in service. It is worthy of the most extensive patronage. By its competition it has lowered rates. The telephone has become a necessity. No longer is it a luxury. The mystery is that it was not discovered or utilized until comparatively within a few years past. But such has been the history of the great inventions.

The steam engine was in existence 130 years before the Christian era, then used for heating purposes. Nineteen centuries elapsed, however, before it was first used for purposes of propelling boats, under the patent of Mr. Watts issued in 1769. During all that vast period oars and sails were the only means utilized in navigating the seas. Why was not the engine, in use before the apostles were chosen to carry the new faith into the ancient homes, utilized as it is in these modern times? Why did not the Angel of Progress roll away the stone of mystery before the coming of these latter days? The world moved on in arts and literature. Great names were placed on "fame's eternal roll"—warriors, statesmen, poets, writers, orators, sculptors and painters came out from the bosom of nature and wrote their imperishable names on the world's record, and furnished masterpieces as yet unequaled.

The men of scientific attainments seem to have been reserved for the modern times. Ever since the dawn of human life men and women have wanted to "write and speak at a distance." Why was the knowledge so long withheld? Not until 1632 was the practical suggestion made by Gallileo that through the sympathy of the magnetic needle it might be possible to communicate through a space of two or three thousand miles. Over a hundred years then elapsed before a magazine writer advanced the idea that communication could be made over a wire stretched on insulated conductors. And then the world waited until Morse in 1835 announced the recording telegraph. Now we stand appalled at the new mystery of sending a spark into space and recording across continents and oceans the desires of mankind without visible connection.

During all the waiting centuries men lighted beacon fires on the hilltops, or signaled by moving flags from place to place in order to cover distance. Now we whisper to the electric current and that strange, awful power carries the message to the uttermost parts of earth. Mankind has waited long for the telephone—the power of speaking at a distance. Not until 1831 did the "magic lyre" of Mr. Wheatstone, consisting of two disks connected by a stick of pine, whereby a sound caused on one disk was reproduced on the other, give birth to the idea which afterwards expanded into the modern telephone.

To-day you gentlemen, interested in the maintenance of this great invention, and its successful operation as a commercial project, are assembled in our city, which has the best, latest, up-to-date automatic system, as I am informed, of any locality in this country. Yes, you are welcome. We expect you will come again and when you go hence we want you to carry away a pleasant feeling, while you leave with us good wishes for the city of Battle Creek.

Following the mayor's address John I. Gibson, president of the Battle Creek Business Men's Association, extended the visitors an earnest welcome in behalf of the association, which made a fitting finale to the official words of good cheer.

President Fisher responded in a most happy manner, thanking the people of Battle Creek for their most cordial reception and the many kindly words of welcome and expressions of good will, which were fully appreciated by all present.

A highly interesting and instructive business session of the telephone people then followed, at which President Fisher delivered his annual address, which, filled with witty savings, cold facts and encouraging statistics of the greatest interest to the delegates present and those directly interested in the telephone business. He dealt with statistics regarding the growth of the Independent movement in Michigan, and the facts presented by him awakened great enthusiasm. He showed that in the year 1904 there was an increase of nearly 25,000 Independent telephones in the state, and stated that the increase for the present year would far exceed that number. The latest figures as to the number of Independent telephones in Michigan give a total of nearly 70,000. President Fisher urged that special attention be given to developing rural systems, to the inauguration of a campaign of education teaching Independent telephony in all its different phases and the appointment of legislative committees. He referred to the four automatic systems in operation in the state, the latest of which to be installed is the one in operation at Battle Creek. President Fisher's address throughout was timely and an inspiration to the delegates who had the good fortune to hear it.

N. F. Wing of Grass Lake spoke on "Our Friend, the Farmer," making a telling argument for rural telephones, and pointing out the great benefits to be derived from the same where the systems were conducted on business principles. He maintained that as much care should be taken in

planning and building a rural exchange as in the construction of a city exchange.

W. S. Vivian of Grand Rapids read a paper on "The Progress of the Clearing House," the text of which follows:

When the clearing house department of the Michigan Independent Telephone Traffic Association began its work in the office provided for it by the Citizens' Telephone Company of Grand Rapids, a little over eight months ago, we were, metaphorically speaking, somewhat in the dark. We realized that in order for the undertaking to result in a benefit to all and a detriment to none, it must require careful thought and co-operation on the part of everyone concerned. We started believing that the move—as expressed by the words of the traffic agreement, "to promote and regulate interchanged telephone service between the different Independent telephone companies of the state of Michigan and other states"—would be a success, because the principles involved were right. We did not expect to see our work reach perfection during the first few weeks, or months, or even the first year, because there was all the information that was necessary to be first secured from the several companies, and this information had to be prepared in intelligent form. There were plans to be devised for handling the different departments of the work and the carrying into effect of these plans, and this all took time and will take still more time before it will be complete.

After carefully looking over the needs of the movement the one most important and urgent requirement seemed to be to prepare and issue tariff and routing books that would give uniform rates between the companies throughout the state, and when I mention that in the business reported for the month of August we found over 500 discrepancies in the rates, where the originating station charged one amount and the terminating station a different amount —not infrequently both amounts being wrong—you can the better understand why this book was needed. We adopted a loose-leaf book for this purpose, and have up to the present time issued about 250 of these books, and have on hand orders for about 130 more. We have an exact duplicate in our office rate records of every book that has been sent out. This is found very valuable for reference and in case the original copy should become destroyed.

Sufficient stock was purchased to enable us to issue about 1,000 tariff books, the cost being, when the rates and routings have been entered and express charges paid, about $2.50 per book. We have also had about 3,000 maps made, these being copied from the map that was compiled and published by Mr. Tarte of the Citizens' Telephone Company. It is our desire to keep the records and maps strictly up to date, and this we can do if you will co-operate with us by notifying us promptly of every new office opened, every office closed, offices that check to some other station, and changes from checking some other station to checking direct, also the completion of all new circuits as they may be made from time to time. I am glad to mention that some of our companies are doing this, while there are some that, so far as I know, have not made a change or an addition in their territory in the past eight months. I trust that all will co-operate in this feature of the work.

Our second undertaking was to decide on a method of reporting and the preparing of proper blanks for handling the reports. A blank for the monthly report of interchanged business (that is, business passing over two or more companies' lines) was prepared and a supply printed and sent out in time for the July business. About ten out of the thirteen companies that were then members responded and sent in reports, and while everything did not work just as smoothly as we would have liked, still, considering that it was new to all, we got along fairly well. We soon discovered, however, that our first blank was not complete enough and after talking with representatives of several companies we had the blank printed that we now have in use. While there are still some minor details that we can improve upon, we feel that this blank meets fairly well the requirement.

One of the most important departures, perhaps, from the old method of reporting, is the comparatively new manner of handling 'reversed business" for the Michigan companies, it being decided last fall by your traffic committee that the originating station or company should receive the commission on a message, regardless of where it might be paid. This means that every company reporting to the clearing house must see that "tolls sent paid," "tolls sent collect," "tolls received paid," and "tolls received collect" appear separately on all reports. One other very important feature of the report is the correct and complete routing of the business. This should be done whenever it is practicable for you to do so.

I have had letters from certain companies where they have stated that they were not receiving as much mileage on through business as they should, and inasmuch as it seems to be very difficult for our companies as a whole to give the correct and complete routing in a great many cases, I would suggest that companies that care to do so prepare and forward with their regular report a report also of the through business. If you think this would be advisable —and it seems to me it would be—we would then be able to make our mileage distribution with more accuracy, and assure these connecting companies of their fair proportion of mileage.

It might possibly be of interest if I give a brief outline of the way these reports are handled. They are first checked for "errors," the error clerk checking through the report item by item, comparing the "out business" found on the one report with the "in business" found on another report, and on items where the "out business" as reported will not offset the "in business" as found on the other report, an "error" is checked and later placed on the "Error Report," and an explanation required from the company that is in error.

The next step is to make the proper distribution of mileage. We use for this purpose a blue print of a tracing of Rand-McNally's Michigan map, drawn at a scale of eight miles to the inch. When we have the names of the towns that are doing business, the amount of business, and the complete routing, we measure from the originating station air line to the point where it takes another company's line, and so on to its destination. By multiplying the different mileages received by the number of messages reported we get the total mileage for the month for all business transacted between the two stations.

As soon as the report is gone over in this manner and extensions and footings made, we are ready to make the statement. We first deduct from the gross toll line earnings the amount of all messages that are over 50 cents, because of the 12½ cents commission limit, and on these messages you are allowed a commission of 12½ cents per message. On the balance of the gross toll line earnings 25 per cent commission is allowed. The amount that is left, after deducting the originating commission, is the amount that is distributed to mileages. By dividing the amount of money that is to be distributed by the total number of miles we get the percentage, or ratio, per mile, and from this ratio we determine just how much is due each company from this report. After we have gone through all of the reports in the above manner, they are reduced to a summary, and the balances show whether you owe the traffic association, or vice versa, and statements are sent out accordingly. Up to the present time these credit companies have let us have the use of all amounts that have been due them, but now as rapidly as the money is paid in that is due on account—and according to the assessment, which will be given a little later—we expect to meet these obligations; and in the future as these statements are mailed to accompany same with our voucher check to balance.

The error department is another feature of the work that deserves attention. As soon as we began handling reports we began to notice "errors" in the various reports, so commencing with August we started to check for errors, finding them to the amount of $297.85 for that month alone. The next month, September, we found $327.13; in October we found $460.74; in November $578.45; a total of $1,664.17. We have received replies from a goodly share of the July business, not so many from the August errors, and scarcely any from the succeeding months. We find that one of the greatest drawbacks to our getting settlements promptly on these "errors" is due to the great length of time that elapses between the time of the error and the time that the "Error Report" is sent out. The cause is that each month there are one or two companies that apparently wait until they have nothing else to do, then they send in their report, getting it to us from one to three or four weeks after the 20th. At the next meeting of the traffic committee I am going to try and have them set some specific date for closing the reports.

We find on the "errors" that have been returned, a great many explanations that read like this: "No reply to error card," or "Have sent two cards; no reply." I would urge that every company that has not instructed their several offices to make immediate replies to these "error cards," regardless of where the card comes from, to do so at once. Commencing with the January errors we expect to notify each general manager of all offices in his system that have a charge of this kind brought against them. Another frequent explanation reads, "Company business." This leads us to believe that there are some companies which are not checking all of their messages. As I understand this, it was decided that all messages should be checked, regardless of what they were or who talked, and a settlement made for same through the clearing house in the usual manner.

Now. to summarize this paper, we have, in addition to the rate books, maps, reports of interchanged business, error reports, etc., referred to, issued night rate and overtime schedules, tariff sheets covering rates to the counties of Ohio, and our first tariff bulletin, an eight-page pamphlet, has just been delivered from the printers and will be ready for distribution within the next few days.

We started in eight months ago with a total enrollment of thirteen companies. We now have twenty-two. Last July we received reports from ten companies. For December we received twenty-four reports. Last July there were 11,481 messages reported, amounting to $2,691.99, or an average of 23½ cents per message. For November there was 14,464 messages reported, amounting to $3,602.86, or an average of 25 cents per message. In the eight months we have audited and closed five months' business with a total of 65,000 messages, amounting to $15,785.57, or an average of 24 3-10 cents per message.

The operating expenses for the first year's work, ending June 1, 1905, will be about $3,200. This will include the office equipment,

such as furniture, fixtures, office rate records, stationery and supplies, salaries, etc. At the close of the first twelve months, barring accidents and delay, we will have closed the reports for nine months, and will have audited about 125,000 messages at a cost of about 2½ cents per message.

I wish to mention that I received a letter from a neighboring traffic association last summer in which they say that three cents per message is about as cheap as this work can be handled and expenses paid. Next year, however, we expect to accomplish more at a cost considerably less. At 15,000 messages per month we will audit and settle 180,000 messages at a cost, we believe, of about $3,000, or an average per message of 1 2-3 cents.

In conclusion I wish to say that too much credit cannot be given C. E. Tarte and other officials of the Citizens' Telephone Company of Grand Rapids for their assistance in establishing the clearing house. They have not only donated office space, use of stenographer, local telephone service, and assisted in various other ways, but Mr. Tarte, who is general manager of that company and also president of your traffic committee, has devoted a great deal of valuable time in assisting to organize and expedite the work of this association.

"Care, Maintenance and Equipment" was the subject of the paper read by Edmond Land of Grand Rapids.

F. C. Hughes of Lansing discussed "The Experience of Managers" as follows:

The experience of the local manager, located as he is miles away from headquarters and the base of supplies, must necessarily be of a varied and complex nature and he must necessarily feel the responsibilities placed upon him. He is supposed to be a "hale fellow well met" in his locality and should have a pleasant word and a warm handclasp for all with whom he comes in contact. In order for him to do this it is absolutely necessary for him to perform that most important duty intrusted to him of furnishing good service in the most thorough manner.

Furnish good service, for without it the manager canont be the pleasant, good-natured fellow that he should be, but just the reverse—cross and worried. Without it he cannot increase the subscription list, revenue or popularity of his company to the same extent that he can with it. Without it his collections will be hard, his subscribers disgruntled, his force of help demoralized, and his competitors happy.

To furnish good service it is necessary that you should have good construction, and then keep it good; good instruments, and keep them in good repair; good central office equipment on which you should bestow the most watchful care, for it, like an infant, is susceptible to grave dangers from trivial causes, with just as fatal results. You should have good, competent operators who will work in harmony and strive only for a reward of merit which you should be pleased to bestow for the best work for a given period of time.

Always take it for granted that the party making a complaint has a good reason for doing so, and remember that "a soft answer turneth away wrath," or in other words, using the more modern phrase, "You can catch more flies with molasses than you can with vinegar." The complainant may, and probably will, say *poor service*. This is the time for your soft answer, or rather question, "In what way are you annoyed the most?" By this question you have started a conversation which you will be able to handle in a manner that will enable you to come to an intelligent conclusion as to the remedy which should be administered to relieve the distress of the complainant. Poor service—these words are much abused. They are used to convey the following complaints: Slow answer from central; inability to get the party called for; inability to make the party hear with whom one may be talking, or being unable to hear the party at the other end of the line; inability to get central; and in some cases a complaint of poor service may indicate that the manager has not been as prompt in his collections as he should have been.

Apply the proper remedy in this case, being sure, however, to administer an opiate in the form of a general remedy which I will mention later, and which should be used in all cases of poor service complaints. When the subject has recovered from the effects of this remedy and the operation has been successfully performed, and he and you find that he has made a payment in advance, you will both be surprised to learn how much the service has been improved. Poor service is used to convey a multitude of complaints which I will not mention, but which the manager must thoroughly understand and properly diagnose before he can expect to apply the remedy which will remove the conditions and furnish that good service which we all so much desire.

Complaints should be received and recorded—received from every source from which you can possibly receive them. The collector will receive complaints of which he should make a memorandum, signing his name thereto and deliver to the manager. All complaints of poor service should be referred to the chief operator, who records them and then applies the following remedy:

First. Call up the subscriber and say, "I have a complaint of poor service handed in by the manager," or collector or from whatever source it came; "will you please tell me what has troubled you most?" After getting the desired information, the chief operator says the company will take immediate steps to remedy the trouble and see, if possible, that it does not occur again.

Second. Paint the annunciator a certain color, which indicates to every operator who may answer this telephone the fact that the subscriber is not satisfied with the service he has been receiving and explain to her as near as is possible or expedient what the cause of the complaint is.

Third. Call the subscriber in a day or two and ask if there has been any improvement. At this stage of the game, the operator will in a large number of cases hear the following, "Why, it is fine; what did you do?" It may have been that there was line trouble, instrument trouble, central office trouble, or any one of the numerous causes of poor service, and whatever the cause of the complaint was, you inform the complainant of it and he is satisfied, which he would not have been if you had simply remedied the trouble and said nothing to him about it, for when this man has occasion to complain again he will remember the treatment he received before and will make his complaint accordingly, and if you have not satisfied him on his former complaint, you are just as liable as not to hear the following: "I reported this a month ago and nothing has been done about it."

It is of just as much importance to satisfy a subscriber as it is to remedy a telephone trouble. Different colors may be used to designate different conditions. Red, which is the customary sign of danger, may be appropriately used for general poor service complaints. White may indicate that a certain party has been taken off a party line and placed on another line. Yellow may indicate that the number so designated is frequently called by mistake, and black, the usual finish, would indicate that everything is all right. You would be surprised to see how operators strive to prevent having their boards decorated, as they call it, and how they will endeavor to have those decorations removed when they have been applied. Ten cents worth of water color paints applied as suggested will do more good than one thousand times the amount spent in any other way that I have ever tried.

The operator's primary duty is to answer calls and connect a subscriber with the party with whom he may desire to talk. She is informed that she must forget every word of speech which she has heard except, "What number?" "Busy," and "I will give you the chief operator." By this rule, which is necessary, we have made the position of operator a very monotonous one. We should relieve this monotony as much as possible, first, by providing a recess for the morning, and also afternoon, of a few minutes for each of the operators. We should endeavor to impress each of the operators with a feeling of the importance of her position and should stimulate a desire in the breast of each and every one of them to be the best operator in the exchange.

A start to accomplish this result may be made as follows: Always inform the operator of any dissatisfaction on the part of any of her subscribers, no matter how trivial or unreasonable it may appear and induce her to forestall complaints by reporting any apparent dissatisfaction she may observe when answering calls. Take a given number of test calls each day and record as follows, which is taken from my records of February 7: Average time for calls for February 7, 1905, four and four-eighteenths seconds; average time for ring-offs, two and two-third seconds; quickest answer, one second, by Miss Smith; quickest answer on ring-off, by Miss Johnson, one second; slowest answer, by Miss Tuttle, fifteen seconds; slowest ring-off, by Miss Green, fifteen seconds. These records are given to the operators every day. If they are not forthcoming they will ask for them, which is excellent evidence that their interest in their work has been aroused.

From this record decide which operator has the best record for the month and give the successful operator or operators a day's vacation with full pay, as the reward of merit suggested in my opening remarks. The above test calls may be obtained from the inspectors, but we have found it to be advantageous to have these tests made by the operators themselves. By so doing you place the operators in the places of the subscribers, and you can imagine better than I can tell you her feelings if compelled to wait with a stop-watch in her hand and hear the subscriber say, after a wait of thirty or forty seconds before she is finally answered, that if he always received as prompt an answer he would never complain. You will surmise, and correctly, that she will have a quiet little heart-to-heart talk with the operator who placed her in this embarrassing position.

By these methods you will make the operator's work interesting. Cause them to work in harmony and unison and all will strive for the reward of merit, not so much for its intrinsic value, but that she may be known as the best operator in the exchange. I have found that there is no danger of any particular operator monopolizing this title, and it will be captured at times by the relief operators.

Just a word about inspectors and their duties. Any trouble reported should be remedied the same day it is reported, and not carried over until to-morrow; and the inspector after he has located the trouble and remedied it should endeavor to ascertain the cause, and then remove it, so that the trouble will not be repeated. It may be a crossed line caused by a slack wire, which by pulling up

not only removes the trouble, but prevents its repetition. Or it may be that the whole lead requires pulling up. Of course, the inspector should not stop to do this, but he should not be content until he has made a written report of the condition to the manager.

Numerous instances will be found in any exchange of different things which should be done, but cannot be taken up at once, and these instances should always be before the manager in the form of written reports, and then when a lull occurs in the work of any particular department, by reference to them the manager can, at a moment's notice, put his help at work where it will do the most good.

Now a word in regard to the most important of all telephone duties. All that goes before or may follow is simply an operation leading up to and making it possible to make collections. When the prospective subscriber is ready to sign a contract, be sure and read it to him and see that he understands thoroughly that phrase which reads, "Quarterly in advance," and after this is done the first duty of the collector, after the instrument has been installed and is in working order, should be to see this subscriber and collect for the current quarter, or more if he is willing to pay it. *Do this promptly* and you will find that your new subscribers are willing to pay their bills upon presentation.

If we expect that our subscribers are going to be regular in the *payment* of their bills we must be regular in *presenting them*. If a certain subscriber is regular in remitting and does so by check, mail his bill, but see that it is in the postoffice in time so that he will receive it the first day of the month. If it is necessary to see a subscriber in order to make a collection, do so on a certain day in each quarter. If he is not there leave the bill, taking, however, a memorandum of the amount, including the toll charges, if any, and noting thereon the date you were there, and continue to call on every opportunity until you see him. If he says for you to call on the fifteenth of the month following, put this on your memorandum in his presence; file this "memo" in a card index file, under the date given, and then be there promptly as requested.

Watch the amount of your collections each day and month and endeavor to make them larger for this quarter than they were last, and larger for this month than they were for the corresponding month last quarter. If you fail, do not spend your time looking for an excuse, but use it in an endeavor to do better next month. See the amount of uncollected bills which you are compelled to carry over to the next quarter's business. Cut this amount in two and do not be content until your quarterly reports show that you have reached the desired goal, and then try it again.

I wish to say a word regarding the importance of the individual manager, who is one of the most important cogs in this vast Independent movement, and this fact should be impressed on his mind. He should forget that he may not be a stockholder, but he should remember that through his efforts the stockholder's interests are protected. He should remember that he is highly honored by being selected as a captain in this gigantic army of Independent telephone men, who have made it so interesting in the past for "our friend, the enemy." With these thoughts in mind he will be better equipped to command the division under his charge and proudly march at the head of it, with the Independent shield always in sight, and loudly proclaiming our battle-cry, "On to Boston."

In closing, I wish to give you a motto which I think is most appropriate for any telephone exchange. It is, *Do it now*. It fits so nicely into any branch of the business, and if closely followed by manager, bookkeeper, operator, collector, or inspector, he or she can go to their homes at night with the satisfaction of having done their best. If you *do it now* it would be almost superfluous to say, *don't worry*, which I am told Chauncey Depew says is the height of folly, and he adds, "I spent about one-half of my early life worrying about things which never happened." I once saw a good illustration of this on the cover of a programme issued by the Knights of Korisan, which pictured an individual who had climbed to the top of a small tree in an endeavor to escape from an enraged lion. The tree, as before stated, was small and bent in a dangerous manner under the weight of the man, who was watching the beast over his shoulder. At the bottom of the illustration were the words, "Don't worry." Such advice we should be willing to take at this time for that small, weak Independent telephone tree up which the bold, fearless, and strenuous telephone man of nine years ago took refuge from the enraged Bell lion has grown until to-day we need have no fear if we are protected by its wide-spreading branches which reach from Maine to California.

Don't worry, but use that energy which would be lost in worrying in securing the largest number of telephone subscribers in your vicinity, and then make it a point to do more business every day than your competitor.

In the evening the delegates were tendered a health food banquet at the Battle Creek sanitarium. The occasion was a particularly happy one. Hon. Stanley E. Parkhill, mayor of Owosso, filled the position of toastmaster in a most acceptable manner. The toasts and talks were all timely and greatly enjoyed.

Friday afternoon's session was opened by a timely and helpful paper on "The Value of Organization," by J. B. Ware of Saginaw.

James B. Hoge of Cleveland, president of the National association, was down on the programme for a paper, but was unable to be present.

Hon. Stanley E. Parkhill of Owosso spoke on the subject, "Tactics of the Opposition," in which he handled the Bell without gloves.

"The Situation in Southeastern Michigan" was portrayed by R. B. McPherson of Howell.

F. B. Newman of Grand Rapids had for his subject, "Toll Station Reports," and spoke as follows:

The Independent telephone business has passed through a revolution as far as construction and apparatus is concerned, but not so with the bookkeeping system. The system of reports from toll stations has, as a rule, remained the same. When the Independent toll stations were first established, it was necessary to offer inducements to the public to use the new toll lines. In some cases it was even necessary to furnish the manager of the new toll station with free use of the toll lines for his personal messages, in order to have him accept the agency. The Independent companies, not having the experience that the Bell company had with toll station reports, did not insist on prompt monthly check reports from toll stations. Owing to this, managers and employes did not always check all messages. When a comparison was made with the different toll station reports, errors were discovered, hence, the origin of the error department to stop the leaks. Special attention should be given to the error work, first, for the moral effect, second, the revenue received, and third, that a check is kept on all messages to see that they are properly recorded.

The first month that the Citizens' company of Grand Rapids, established the error department, the total amount of errors discovered was $314.32 line and $35.35 messenger service. Of this amount $61.33 line and $12.90 messenger service was collected and the balance was explained. With the increased toll business and a large number of new toll offices added, the total amount of errors for the month of November, 1904, was $172.05 line and $28.39 messenger service. The total amount of one year's check errors was $2,490.60 line and $291.78 messenger. This would make a monthly average of $207.55 line and $24.31 messenger received from check errors.

In the majority of cases, especially in villages, toll station telephones are usually located in the general store. As the manager's compensation, on a basis of 15 per cent commission, is not a very large sum, he often considers that his other interests demand his attention. He is often rather lax to devote any more time than is necessary to the telephone business, and in some instances, not enough time to serve our patrons properly. From observation, the objection of the toll station manager is, that the compiling of the alphabetical monthly report consumed too much of his valuable time. After the close of the month it is often the case that the manager begins to make the monthly report and is interrupted. Consequently, it is put off for a more convenient time, often delaying the report until it is long past due at the general office.

Time is needed to check the reports after they are received at the general office, consequently, after the error sheet is received by the toll station manager considerable time has elapsed. The manager usually waits for a convenient time before he mails out the error cards to the office that overchecks his station, and managers receiving cards are not always prompt in replying, so that when the detail is finally received by the office that failed to check the original message, it is hard to ferret out why the messages had not been checked when sent. It has been customary to forward monthly a statement to managers of the outstanding error balances due us. These are often disputed, with the claim that he remitted all the receipts that he collected, and that no positive evidence has been furnished; that the calls that we claim were not checked, originated at his station.

I recall a journey to a small toll station, having been advised that the manager intended closing out his business and would not retain the agency of our company. As there was but one other favorable location for the toll station, I interviewed the proprietor of the store to induce him to become the toll station agent. He demurred, claiming that he had been advised by the former manager that the telephone company exacted a complicated report, and that he thought the compensation received was so little, he would not be remunerated for his services. I induced him, however, to accept the agency. I was convinced that we should introduce a simple report, which could be compiled with less labor on the part of the toll station managers.

The Citizens' company has adopted, for its Class D offices (small toll stations) a daily record book, provided with carbon paper. At the close of the month's business, it is only necessary for the manager to add up the total business, deduct his commission, and remit the balance due to the company. This expedites the forwarding of the report and furnishes the general office with a detail of

all messages had to and from toll stations. It is true that the telephone company is put to an additional expense of compiling the detail in alphabetical form, but the compiling can be done cheaper and to a better advantage by competent clerks in the general office than by persons not familiar with the company's method of doing business.

But the principal benefit derived from the new form of report is that instead of sending out an error sheet, showing the totals of the messages had with other offices that were not checked or that were overchecked, first, we obtain from Classes A, B and C the detail of messages not checked by the Class D offices. We can then forward to the Class D offices a complete detail of the items that were not checked, thus overcoming the delay, to a large extent, of receiving reports. The toll station manager appreciates the fact that the much dreaded correspondence about the error work is eliminated.

The Citizens' Telephone Company some time ago classified the outside exchanges and toll stations as follows:

Class A consists of the large exchanges with salaried managers.

Class B, a large exchange where a commission is paid the manager on rental and toll receipts.

Class C, a smaller exchange, say of fifty subscribers or less, where a commission manager is employed.

Class D, a strictly toll station telephone.

The classification of the offices has assisted, to a large extent, in planning for the new stationery and different forms of reports needed on account of the local conditions. As a rule, Classes A, B and C offices are furnished with the duplicating check ledger, the original of the check ledger report being forwarded monthly to the general office. This enables the error department to know the total amount of business checked daily with every office. The error department can check the totals daily, instead of the total business had by months.

In the Classes A, B and C offices with a salaried manager, our receipts are sufficient to have the manager devote his entire time to the telephone business, hence, you can demand prompt attention to the reports and correspondence, but with the Class D smaller offices we should work to refrain from adding any more clerical work than is absolutely necessary.

Members of the Clearing House Association should instruct the managers of their various toll station offices to reply promptly to error correspondence that is received from other companies' stations, especially with the error sheets on interchanged business, as considerable time elapses before the error sheets are forwarded by the Clearing House Association to the general offices of the various companies.

The Citizens' Telephone Company recently introduced a new ledger for the purpose of recording the amount of outward and inward tolls received monthly from toll stations. Each office has a column so ruled that a comparison can be made quickly of amounts checked by the sending and receiving offices. Columns are provided for the undercheck and overcheck. In the past, as a rule, the undercheck has been closely followed, but we have found it to our advantage to also watch the overcheck, as it enables us to ascertain what offices are not properly checking the inward business. With the new tariff and routing books, check errors should decrease, but in many cases it was found that the error was due because the proper rate was not checked by each office.

Vists should be made to the toll stations as often as possible, as I believe it is good policy to keep in touch with the managers. Very often a personal visit brings out valuable information pertaining to local conditions that is not always brought to your attention in correspondence. A card record of the Citizens' Telephone Company's toll station is kept on file with all information pertaining to the toll stations noted thereon. If a monthly report is not received by the tenth day of the following month, a postal card is mailed, calling the manager's attention to the fact that the report is in arrears. Should the report not be received by the 15th of the month a letter is mailed; if not received by the 20th, a personal letter is forwarded by the general manager. With this system of closely following failure to receive reports, we have educated the managers to forward their reports promptly.

All messages should be checked, even if sent on company business, except those of the repair men, when testing the lines for trouble. If the company's message should pass over the lines of two companies, the originating company would report to the clearing house in the usual manner, when the receiving company would get credit for the mileage on their lines.

W. J. Melchers discussed the question of "Toll Service Errors."

The election of officers was left to be decided at a committee meeting scheduled to be held at Lansing, March 29.

* * *

DISTRICT MEETINGS OF OHIO INDEPENDENTS.

The meeting of District No. 2 of the Ohio Independent Telephone Association, comprising the counties of Summit, Portage, Mahoning, Stark, Columbiana, Carroll, Jefferson, Harrison and Tuscarawas, was held at Canton, Ohio, March 2. There was a large attendance and the deepest interest was displayed by all those present in the proceedings. Statistics were read which show that there are in the state of Ohio, outside of Cincinnati, 182,793 Independent telephones; 661 exchanges and 1,324 toll stations; 7,990 stockholders, and a capital of $26,000,000 invested in Ohio.

The annual meeting of the members of District No. 3, which comprises twelve counties in the southeastern part of Ohio, was held at Zanesville, March 1. About sixty-five members and stockholders attended the meeting and much interest was manifested in the various subjects discussed. Addresses were delivered on the following subjects:

"The Best Method of Advertising," A. C. Davis, general manager Marietta and Parkersburg Telephone Company.

"Shall We Standardize the Directory, and How Often Should It Be Published?" A. H. Doudna, general manager the Belmont Telephone Company.

"Farm Line Development: How Can It Be Best Accomplished?" S. C. Kissner, general manager Coshocton Citizens' Telephone Company.

The ideas presented by these speakers were discussed in a general way and much interesting information was brought out. Among the prominent men outside of the district who were present and made addresses were Frank L. Beam, president of the association, and M. B. Overly, general manager of the United States Telephone Company. A careful computation of data showed that in the Third District there are forty-five Independent telephone companies and 4,571 stockholders, operating 19,017 telephones, as against 7,173 Bell telephones in the same territory.

J. B. Rhodes was re-elected vice-president of the district and delegate to the National Interstate convention to be held at Chicago in June. H. W. McKee, of Cumberland, was re-elected secretary. Delegates to the state convention were elected as follows: Coshocton county, L. P. Galliher and S. C. Kissner; Muskingum county, J. B. Rhodes and S. M. Grangera; Guernsey county, William Hoyle and Frank Sheppard; Belmont county, A. H. Doudna and A. B. Hobson; Noble county, W. H. Bowron; Monroe county, F. C. Huth; Morgan county, W. A. Cosgrave; Washington county, A. C. Davis; Perry county, S. L. Pake; Athens county, C. L. Jones and A. B. Allen; Meigs county, George V. Lashler and W. Stansberry; Gallia county, C. Burr Forrest.

Independent telephone interests were thoroughly considered at a meeting of Districts No. 4 and 9 held in Columbus on February 28. Representatives of 160 exchanges in the two districts, comprising twenty-four counties in the southern part of the state, were present. The conference was presided over by Dwight E. Sapp of Mt. Vernon, and among the 100 telephone men present were: J. B. Hoge of Cleveland, president of the National association; Frank L. Beam, president of the Ohio Independent Telephone Association, and M. B. Overly, general manager of the United States Telephone Company.

There was a general discussion of telephone conditions, and among the subjects considered were the recognition of the rights of the different companies; rules governing the operation of the exchanges; uniform system of bookkeeping, publication of telephone directories and the best method of advertising.

President Beam of the state association read an interesting report of the business of the Independents, compared with that of the Central Union, in the two districts, presenting this table:

	Ind.	C. U.
Number exchanges	160	28
Number toll stations	360	132
Number subscribers	43,923	15,078
Number stockholders	1,575	0
Number companies	63	1
Ages companies, oldest	8	20

The counties included in the districts represented are: Ninth District—Crawford, Richland, Ashland, Wayne, Holmes, Morrow, Knox, Union, Delaware, Licking, Franklin, Fairfield and Hocking. Fourth District—Pickaway, Fayette, Vinton, Jackson, Scioto, Lawrence, Pike, Adams, Highland, Clinton and Ross.

Delegates on a basis of one for each 1,000 telephones were elected to the state convention, and officers also were elected for the two districts. The meeting was the best attended in the history of the two organizations, and attested to the fact that the Ohio Independents are enjoying great prosperity.

Interesting figures showing the relative strength of the Independent and Bell telephone companies in District No. 5 were produced at the district meeting in Hamilton, February 24. The figures show that the Independents have 6,904 telephones in that district, and the Bell 2,338. The Independents have thirty-three exchanges; the Bell seven. The Independents have 91 stations; the Bell 41. The Independents have 437 stockholders; the Bell none. The district is composed of Butler, Preble, Warren, Brown and Clermont counties. Forty-two stockholders and managers were present at the meeting and every Independent company in the district was represented.

W. Gilbert Thompson, manager of the Hamilton Home Company, was unanimously re-elected vice-president of the Ohio Independent Telephone Association for the Fifth District and was also chosen as a delegate to the National convention. The following delegates were elected to the state convention: W. R. Fee, Milford; L. D. Lesh, Eaton; S. E. Morton, Camden; Frank Binkley, Lebanon; W. H. Brown, Batavia; James Stumps, Waynesville, and John C. Slayback, Hamilton.

Instructive addresses were delivered by Judge Fisher of Eaton; Frank L. Beam, president of the Ohio Independent Telephone Association; Mr. Miller, manager of the Dayton Independent Company, and Mr. Thompson. The addresses reviewed the wonderful progress of the association last year and, in an informal way, laid out a programme of progressiveness and aggressiveness for the coming year.

It was reported to the meeting that the long-distance connections were rapidly being made by the United States Long-Distance Telephone Company and an agreement on toll rates between each county was made.

The consolidation of the various companies in the association was thoroughly discussed and a committee was appointed to prepare the plans for the consolidation. Judge Fisher delivered an address on "Uniform Rates Throughout the District." A sumptuous banquet was served at the St. Charles Hotel, after which the convention adjourned to meet in Eaton, Friday, May 26.

In the absence of Vice-President J. C. Reber, H. P. Miller of the Home Telephone Company at Dayton presided over a meeting of forty-four stockholders, officers and managers of twenty-eight Independent telephone companies constituting District No. 6, at Dayton, February 23. The Sixth District comprises Montgomery, Miami, Darke, Shelby, Clark, Greene, Champaign, Logan and Madison counties. Within this territory are thirty exchanges, financially represented by 1,482 stockholders. The amount of capital directly interested totals about $4,000,000.

During the course of the meeting the territorial rights of the various companies in the district and the prevention of encroachment upon one another's territory furnished food for some interesting addresses. Among those taking part in the discussion of the subject were W. D. Rush of Greenville; Gilbert Thompson of Hamilton, vice-president of the Fifth Ohio District; Frank L. Beam of Columbus, president of the Ohio association, and others. Judge Elam Fisher of Eaton spoke interestingly of the efficiency of the Independent service in Ohio.

The reading of the various reports brought to light some very interesting statistics. It developed in the report of President Beam that in the Sixth District there are 25,050 Independent telephones, and 11,381 Bell telephones; that the Independent companies operated 63 exchanges to 16 of the opposition, and 172 toll stations to 112 operated by the latter.

I. H. Thedick of Sidney was elected to fill the office formerly occupied by J. C. Reber, that of vice-president of the Sixth District. H. P. Miller was chosen to represent the district at the National convention in Chicago.

Those who attended the meeting were: Messrs, S. E. Morton, C. E. Morlatt, Camden; J. B. Addison, Columbus; J. E. Meyers, Dayton; L. D. Lesh, C. B. Cakfair, Eaton; J. Toole, New York; W. H. Baum, Batavia; W. G. Thompson, Hamilton; C. E. Cox, Eaton; E. E. Williams, Oxford; S. B. Douglas, Morning Sun; J. W. Hutchinson, Oxford; C. C. McCreary, Morning Sun; Elam Fisher, Eaton; John G. Somers, Hamilton; Wm. R. Fee, Milford, Ohio; M. B. Overly, Cleveland; H. P. Miller, Dayton; Frank L. Beam, Columbus; Raymond Dynes, Cleveland, and W. D. Rush, Greenville, Ohio.

* * *

NORTHERN ILLINOIS MUTUAL TELEPHONE ASSOCIATION.

The Northern Illinois Mutual Telephone Association held a meeting at Milledgeville, Illinois, March 14. This association is a new one, having been organized February 1 at Morrison. The object is to link together the mutual telephone companies in one chain for mutual protection. The officers are as follows:

President, F. Trautwein, Morrison; vice-president, S. P. Culp, Manlius; secretary, H. G. Hotchkiss, Prophetstown; treasurer, A. M. Fike, Milledgeville.

Following is the programme which was presented:

Address, F. Trautwein, Morrison.

"The Object of a Mutual Telephone Association," D. D. Stitzey, Lanark Mutual Telephone Company.

"Is the Mutual Telephone a Success?" W. H. Puterbaugh, Lanark Mutual Telephone Company.

Reports of directors from each company.

"What Does the Community Owe to the Mutual Telephone?" A. B. Puterbaugh, Milledgeville Mutual Telephone Company.

"Where Are We, How Did We Get Here, and What Is the Future?" A. M. Fike, Milledgeville Mutual Telephone Company.

"Co-operation Our Safeguard to Future Success," H. L. Ewing, Whiteside Farmers' Mutual Telephone Company.

* * *

TELEPHONE MEN MEET AT GALVA, ILLINOIS.

A meeting of Independent telephone companies was recently held at Galva, Illinois, and some thirty representatives of different companies were present. The purpose of the meeting was to form an organization for the mutual protection and benefit of the different companies, and to better and facilitate the service.

The counties to be represented were Henry, Bureau, Stark, Knox, Mercer, Warren, Rock Island, Peoria, Marshall and Henderson. F. M. Ashe of Kewanee was made temporary chairman of the organization and W. S. McQuiston of Monmouth temporary secretary. A committee was appointed to arrange a schedule of tolls.

One of the purposes of the meeting was to enlarge the Western Illinois Independent Telephone Association, of which nearly all those present were members. One of the special questions discussed at the meeting was the proposition to connect all the larger cities within a radius of 100 miles by copper wire toll lines so that an excellent long-distance service could be obtained.

Digest of Telephone Patents

Conducted by Edward E. Clement

782,828—H. M. Crane. Measured Service Telephone Exchange System.

This is a service meter scheme particularly adapted to two wire multiple circuits. In the operation of the system illustrated the subscriber's meter *h* is intended to be actuated after the subscriber has hung up his telephone at the end of a conversation. The meter is connected between the tip spring *a'* of the jack, and the tip side of line. When the cut-off relay pulls up upon insertion of a plug, a short circuit *1a* is closed direct from the tip spring to line around the meter. At the end of the conversation the operator presses a special key *k*, which connects the free side of battery through a cord circuit meter *1* to the tip of the plug, takes battery off of the supervisory relay and the sleeve of the plug, and substitutes a ground. As the cut-off relay is always tapped off from the sleeve side, it lets go and breaks the shunt around the line meter, which takes current from the tip of the plug to earth. This operates the meter, whose magnet closes a pair of contacts *h'* to put battery on the sleeve side and back through the supervisory, the flashing of the supervisory lamp showing the operator that the call has been recorded.

782,937—H. G. Webster. Telephone Exchange System.

This is a two-wire multiple common battery system assigned to the Stromberg-Carlson Company, the invention relating particularly to means whereby ringing current may be sent out over either side of a metallic circuit and at the same time a continuous current may be directed through the cut-off relay to hold up its armature and prevent vibration due to the alternating current. The cut-off relay in the circuit shown takes current from the common battery through the tip strand of the cord, and two ringing keys are provided, one for sending ringing current over the tip side, and the other over the sleeve side of the line. The key *43* which puts generator to the sleeve side has an outside contact *45*, whereby it puts the battery to the tip side at the same time. The key *44* connects battery through a relay *53* and contact *52* to the tip side, and the relay thus energized connects the ringing generator onto the tip outside of its own windings. A relay *48* is provided in the generator circuit, which pulls up and lights a lamp as a ringing signal.

782,944—G. Babcock. Multiparty Line Locking-out System.

This patent also is assigned to the Stromberg-Carlson Company. The invention is in the nature of an improvement on the patent granted to Mr. Babcock June 28, 1904—No. 763,351—described in our issue of August 1. The system of the patent has a step-by-step apparatus at each substation set so that by sending a certain number of impulses one station may be selected and its talking circuit closed, those at the other stations on the same line being left open. Mr. Babcock says that in such systems the talking apparatus being usually connected in a branch of the line-limbs, and as an abundance of apparatus comprising electric-magnets and windings is employed in such party line substations, there are sufficient stray currents and leakage to influence the receiver at a station whose branch is open, whereby subscribers intended to be locked out can overhear conversation at all times. The object of the present invention is to prevent this, and the principal feature of invention is a shunt around the receiver, which absolutely shortens the same at every station locked out, and so prevents any overhearing. This is adaptable, of course, to any scheme of the kind.

In the diagram the shunt circuit around the receiver may be traced as follows: Receiver *24*, spring *23*, *22*, wire *31*, spring *13*, *14*, wire *32*, wire *33*, wire *34*, through the switch-hook springs, and through secondary *35*; *s* is the stepping magnet, and the operator steps around the locking device by depressing the calling key *38*, and actuating the key *39* to send current impulses to step the switch arm *11* around the ring *4*. When key *39* is turned to the right the cord is short-circuited through *40*, *41*, *42*, *39*, to clear the line of static charges. When the lever engages the pin *6* at the desired substation the operator releases key *39*, and depresses *50*, sending current through magnet *16*, drawing over lever *18* and dropping detent lever *20*, but at the same time spring *22* is drawn away from *23* to again open the shunt. The magnet *16* at all other stations is not energized, as this can only be when the arm *11* is in position over the hole containing a pin, this hole being different, of course, at each substation.

783,231—L. Steinberger. Hygienic Telephone Receiver.

This is a soft rubber cap for the end of a receiver, with a web that covers the front of the cap, to prevent contact with the ear, a rim around the edge with a number of straight faces to prevent rolling when the receiver is laid down, and a flange that extends back and by its elasticity shrinks tightly behind the cap and around the neck of the instrument, to hold the shield in place.

783,279—C. M. Jacobs and A. H. Nicholson. Switch for Electric Selective Signaling Apparatus.

These patentees hail respectively from Maidenhead and Wendover, England. They state that their invention relates to selective signaling systems, and there does not appear to be anything strictly telephonic in the device. Reference is made to British patent No. 146 of 1902 and No. 23,255 of 1902, for a disclosure of the system in mind. The present patented device is really a commutator built like a series parallel controller, that is, with a cylinder carrying a lot of studs which may be interconnected to form various combinations, together with a row of contact springs co-operating with the cylinder contacts and forming the terminals of the substation selective relay circuits. In all this selective work the connections at each substation are a little different from those at any other, and these connections may be changed at will by rotating the cylinder.

783,283—W. Kaisling. Telephone Receiver.

This patent is assigned to the Stromberg-Carlson Company, and presents a variation on the widely known diaphragm supporting cup of metal which has come to be identical with the names of North and Burns. The cup or bell *14* in this case has a peripheral flange *18* threaded to receive the rubber cap *2*, and its reduced rear end *17* is threaded to receive the front end of the shell, which extends up to the point *19* and completely covers the metal cup. The magnet structure is adjustable within this cup or bell, the carrying block *11* lying between the poles of the permanent magnet and the soft iron pole pieces, being threaded to fit the neck of the cup at *13*. The adjustment is obtained therefore by merely turning the magnet structure; and when secured is maintained by the locking bar *23* extending across the edges of the rear end of the cup,

and when screwed down clamping the carrying block *11* by increasing the thread friction.

783,302—N. E. Norstrom. Automatic Telephone Exchange.

The subject of automatic telephony has recently received such an impetus in public estimation that I suppose anything in the way of news about the automatic is welcome. The truth is that acceptable automatic apparatus and circuits which will stand the severe tests that high grade manual apparatus stand, have yet to be designed, or perhaps I would better say, have yet to be announced. Still, some good things have come out of Nazareth, and while the most widely advertised and widely used schemes are not necessarily the best, there is enough in sight to warrant the belief that at least a foundation for the system of the future will be laid in the next year or two.

The present patent is issued to Mr. Norstrom as assignor to John Anderson of Salina and M. E. Richardson of Sterling, Kansas. The application was filed April 10, 1900, and I will venture to say that the apparatus as shown is perfectly operative, but will never be used extensively. The switch, which is the heart of the automatic system, was evidently designed to avoid infringement of the Strowger patent. Instead of having one contact moving up to the desired row and then around that row, Mr. Norstrom provides vertical rows, and a series of vertical ratchet bars or racks, one for each row. Along the upper end of the rows extends a shaft carrying pinions *27* engaging the several racks, and on the outer end of this shaft *26* is a ratchet wheel stepped around by what would ordinarily be called the vertical magnet. When these pinions revolve, any rack in engagement therewith will be carried up step by step, and as each rack at its lower end carries a contact *33*, the particular contact will be stepped up as desired till it reaches the line contact wanted. All the rack bars are normally back out of contact with the pinions. The switches are tilted so that the racks will fall back by gravity. In order to select a particular row and the particular rack for that row, and to put that rack into engagement with its pinion so that subsequent impulses will lift it, a series of cam fingers *41* is mounted on the shaft *40*, carrying on its outer end a ratchet wheel by which it can be stepped around by a second magnet. Although mentioned second this magnet is operated first. In selecting, the shaft *40* and the fingers are first stepped around. As each finger is a step behind the next one, and each as the shaft turns pushes up its own rack and then releases it, a proper number of impulses will put the rack into engagement which controls the row of contacts in which the desired line contact is located. The next set of impulses steps up the rack and selects the contact in the row.

There are five claims in the patent, three of which are directed to the mechanical structure of the racks and fingers, etc. The other two are directed to a busy-back feature in the circuit. In the second diagram presented herewith *121*, *125* and *134* indicate the subscribers' line wires. A magnet *C* in the individual switch at central, beside other matters controls current in the subscriber's circuit. When a busy line is selected, that is, one already connected, this magnet *C* gets current enough to pull up, and thereafter makes and breaks its own circuit so as to act as a buzzer, producing a humming noise in the calling subscriber's receiver to indicate that the line wanted is busy.

There are ten pages of drawings.

783,340—H. G. Webster. Telephone Exchange System.

This is a selective party line scheme using the well known arrangement of biased ringers connected between opposite sides of the line and ground. The patentee states that heretofore if a subscriber happened to have his telephone off the hook pulsating current sent to one side would get to both sides and produce false signaling. To prevent this, when he puts signaling current on one side he grounds the other side. A high non-inductive resistance is preferably connected in series with the ringer at each station. An attempt is also made to claim the insertion of a transformer between the generator and the line in ringing, the idea being that by stepping up the ringing current for the biased bells, stronger springs can be used, and false taps due to line discharges avoided. A relay is included in the ringing circuit in each case, lighting a lamp when ringing to indicate to the operator that current is actually flowing as desired.

783,354—J. M. Beever. Telephone Switch.

This is a two-way switch for intermediate stations on a party line, whereby the line one way or the other is cut off when the local circuits are connected up. The movable part of the switch is star-shaped and pivoted at its center. To connect the local circuit to right or left of the line the upper point of the star is moved over in the desired direction, breaking the other connection and bridging the local circuit of receiver and transmitter to line in the desired direction.

783,419—E. A. Buell. Telephony.

This patent is assigned to the Selective Signal and Telephone Manufacturing Company of Sycamore, Illinois. Mr. Buell is an Englishman and resides in Dekalb, Illinois. The invention is a step-by-step selective scheme employing polarized magnets. It is intended that subscribers on the same line may be able to call each other without the assistance of an operator, that when in use connections may be secret, *i. e.*, other parties locked out, and that the additional apparatus required shall be capable of application to any instrument and line without changing existing apparatus, being independent thereof.

The selecting apparatus at each substation comprises a step-by-step wheel *24* having two insulated teeth *25* and *26*, separated by a distinctive number of other teeth at each substation, a polarized magnet *21* actuating this wheel through a ratchet bar *23* and ratchet *27*, a polarized locking magnet *35* in series with the stepping magnet, both being bridged on the line; and a polarized release magnet *38* connected from the sleeve side of line to ground when the stepping magnet *31* throws over its armature in reverse position to that shown, which is normal. At central the operator has a ringing key which she uses by repeated actuations of the lever *9* to send pulses of current over the metallic circuit to the stepping and locking magnets *31* and *35*; a pole changing key *44* by which the battery *40* is connected one way or the other to the ringing key *9* to determine the direction of current sent to line; and a grounding key *52*, together with a ground ringing key *12* for the calling generator *6*. To ring over the metallic circuit with alternating current from generator *6*, the keys *44* and *52* are left at normal and the ordinary ringing key *9* alone is used. To select a station the key *44* is used to connect the battery *40* in proper direction, key *9* is used to send the proper number of pulses, key *44* is again used to reverse and lock the wheel *24* at substation by causing the magnet *35* to catch hook *36* into hook *29* on the wheel; and to restore all apparatus the grounding key *52* is used, when the magnet *31* has thrown its armature over to cut in the release magnet *38* at each station, the latter then taking current over the ground and lifting both pawls out of its ratchet wheel, which is returned to zero by a coiled spring.

The objections to this scheme are the number of combinations required to be made at the substation, and corresponding combinations by the operators; and the liability to trouble through the failure of some adjustment. A minor point is the closing of the talking circuit through contacts

not of platinum, and which might go bad in consequence. At the central station the operator has the usual duplicate selecting and indicating set by which to know when she has selected the wanted station. Each substation telephone is shunted through the wheel *24* and the pawl *27* when not called or calling. This is a good feature.

783,440—W. R. Kimball. Mouthpiece for Speaking Tubes or Telephones.

This invention has for its object to prevent the speaker's words from being overheard, and also to increase the volume of sound passing into the transmitter. The device is intended to be attached to the ordinary mouthpiece, and consists of an outer casing *A* of hard rubber or metal, lined with soft rubber projecting beyond the casing, a central tube *E* and around this a filling of smaller tubes. At the outer end of the soft rubber lining may be a "pneumatic edge," and the tube is elliptical in cross section, looking like a fish's mouth when open. At the inner end a rubber ball *K* is used to seal the ordinary mouthpiece, and a relief tube *H* leads off the excess pressure. I do not know what led Mr. Kimball to make this invention, or Christopher Youngman, the assignee, to buy it, but from a telephone standpoint it is very wonderful.

783,510—W. M. Davis. Telephone Exchange System.

This is an alleged clickless exchange circuit. The lines are permanently connected to the battery bus bars through choke coils *11-12*. Each line has a signal relay *13* which is shunted when a plug is inserted. The cord circuit has no battery connection direct at all, but is divided by condensers in the usual way and across each end a high resistance supervisory relay is bridged. The current supply from the battery is through the choke coils *11-12* to the line jack springs *16-17* and thence through two parallel paths, one including the supervisory relay in the cord, and the other the subscriber's line and substation. When the subscriber's telephone is in use it is supposed to shunt the supervisory relay, robbing it of sufficient current so that its armature will be retracted.

The patent is assigned to the Stromberg-Carlson Company, and the patentee refers back to his application, Serial No. 84,376, filed December 2, 1901, wherein he says he showed the same invention applied to trunk circuits.

783,861—A. W. Hammer. Telephone Switch.

This is another two-way switch, whereby an intermediate subscriber on a party line may connect himself one way or the other, breaking the through connection at the same time. The line is metallic, with one side continuous and the other side in links from station to station, terminating at each station in the switch arms *35-37*. At each station a tap is taken off the continuous side of line and ends in a third switch arm. When the switch is thrown to the right it shorts the right-hand end of line and grounds it on the plate *22*, at the same time connecting the left-hand end to the local telephone. When thrown to the left it reverses this connection. When in its normal or middle position it completes both sides of the line through the station and bridges the local telephone.

784,052—W. Kaisling. Electromagnetic Device.

This is the well known bell-crank armature relay which has been extensively used and advertised by the Kellogg Company and others. The present patent is assigned to the Kellogg Company and claim 1 reads as follows.

1. The combination with a magnet, of an armature therefor having two arms extending at an angle to each other, a support having a knife edge adapted to fit into the apex of the said angle and to form a support for the armature upon which as a fulcrum it may rock, one of said arms of the armature serving to complete the magnetic circuit of the magnet, and parts adapted to be operated by said armature when it is actuated, substantially as described.

The invention, broadly speaking, is in the bent armature supported on an edge, and the contact springs lying along the top of the magnet. The claims are even broader.

784,088—W. D. Watkins. Telephone System.

This is a selecting device for party lines, intended to cut out every subscriber on the line during conversation, except those whom the operator selects. The specification of the present patent wastes a great deal of valuable language describing a number of unimportant details which no one will ever use. The entire invention may be stated in a few words. Patent No. 695,976 was granted Mr. Watkins June 26, 1902, for a step-by-step selector, locking the clapper of the subscriber's bell until released by the operator. He contemplates using the same thing in the present case, and adds to it a switch which is tripped when his bell rings so as to close his talking circuit. A step-by-step indicator is shown at central, and the subscriber either waggles his hook or works a circuit breaker to tell the operator his number. As long as he holds this circuit breaker closed the selecting device is locked at central, and inasmuch as the substations are all in parallel no one else can get in.

784,175—E. Parsons. Automatic Telephone Repeater.

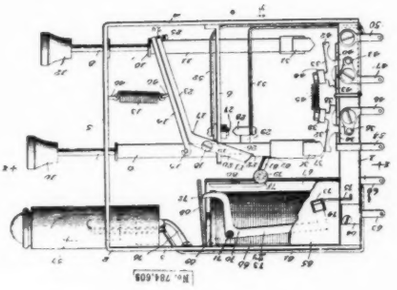
Emory Parsons resides in Chicago, and his repeater has two diaphragms with a granular microphone chamber between them, one electrode being carried on each diaphragm. Close to the outside face of each diaphragm is a receiver magnet of the watch-case variety, and these magnets are connected up in the receiving circuit. The microphone is connected as usual in a local circuit with the primary of an induction coil, the secondary of which goes to the line into which repeating is desired. The circuits are very simple, and are quite liable to give trouble, since the receiver of each repeater is connected to its line in parallel with the induction coil of the transmitter of the other repeater. The conditions are correct for re-repeating.

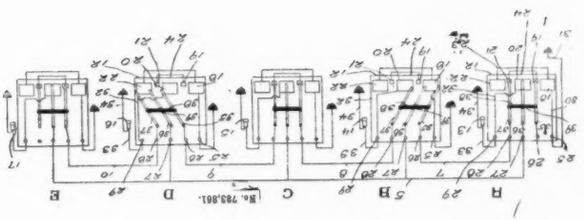
784,292—A. K. Andriano and H. Herbstritt. Direct Line Circuits and Switching Mechanism for Telephone Systems.

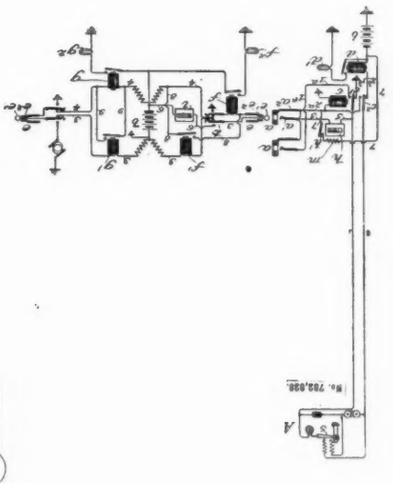
The total number of combinations which can be made with things taken two at a time has been known for a long while, but this is the gist of the present invention. It is an intercommunicating system, each substation being provided with the usual bell and talking set and a local battery, as well as a selecting switch. The circuits comprise a number of direct conductors and a number of return conductors in groups, one direct conductor and one return conductor being combined at any switch, or rather pair of switches, in a substation to make up a circuit. A pair of subscribers by each setting his switch arms to the same wires can make up a circuit connecting them. The patent is assigned to the Direct Line General Telephone Company of San Francisco, California.

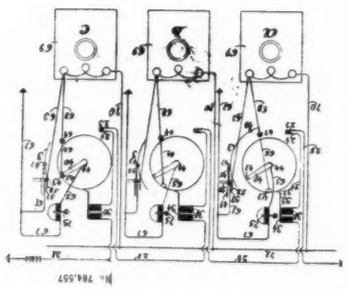
784,498—J. K. Norstrom and H. M. Graif. Automatic Telephone Exchange System.

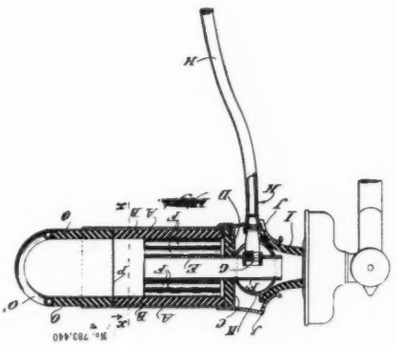
This is another of the Norstrom set of patents, assigned to the Automatic Telephone Company of Chicago. The object of this invention is to provide a system wherein for a switchboard accommodating a given number of subscribers a smaller percentage of switches may be required, say ten per cent. The idea is that a calling subscriber gets control of the first idle or inactive switch, and uses that to connect himself with the wanted subscriber. After he has once called and taken possession of a switch no other subscriber can get in, the next idle switch being then automatically brought into reach of the other subscribers. Stated in a word, the scheme depends upon bringing the circuit

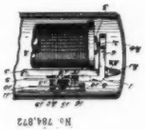


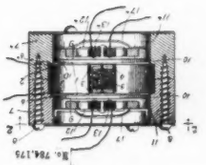


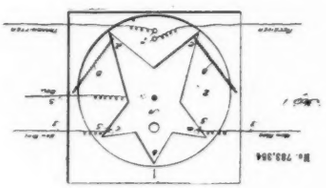


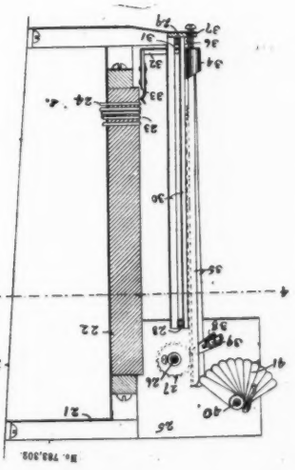


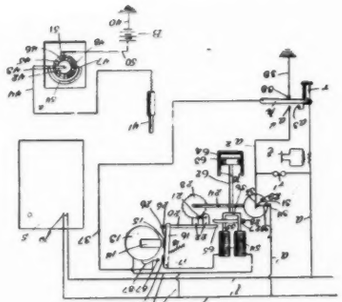


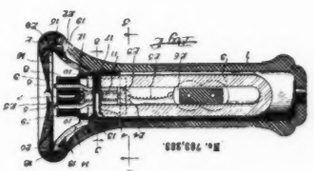


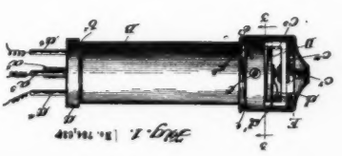












of each switch within reach of each line at a point of control, or in other language a series of devices for controlling each switch, one of such devices being operatively associated with each subscriber's line. It will be seen that this apparently limits the usefulness of the system very materially, on account of the enormous quantity of auxiliary apparatus such as relays required in an exchange of any size. If we assume ten per cent as the number of switches relatively to the number of lines, a 100-line exchange would require 1,000 control devices to control ten switches. It would apparently be better to avoid complication by sticking to individual line switches. In the drawings of the patent five line circuits are shown, and three switches. There are nearly forty relays required for this combination, most of them with five or six pairs of contacts.

There are nearly 5,000 words of text in the patent, but I will endeavor to state the principle of operation in a sentence. A connection is initiated by the subscriber grounding one side of his line, which affects what is called his primary control relay. This closes the circuit of an idle switch control relay, which closes other circuits, giving him possession of the switch operating relay. The circuits of said switch are then cleared through their connections with all the other lines, so that the next subscriber coming in gets on the next switch control which may be idle. The subscriber then goes ahead in the ordinary way and sends impulses to work the switch step by step and select the subscriber wanted. For those interested in this class the patent is worth the five cents it costs.

784,546—W. Calhoun. Coin-Operated Telephone Locking Device.

This is a receiver lock comprising a flat coin chute with a receptacle for coins at the bottom, the whole adapted to be fastened to a desk or wall set by clamps, so that the receiver hook is held down and cannot be raised except after depositing a coin. The locking is effected by a clamp *g* attached to the receiver hook and passing into the chute casing, to which it is pivoted. Its inner end engages ratchet teeth on a spring-pressed dog. When a coin is deposited it falls on this dog, and then by turning a key *k* in the coin and dog are forced over, releasing the clamp rod and permitting the receiver hook to rise. A key-hole is provided so that authorized persons can unlock the hook with a key and without depositing a coin. The patent is assigned to the National Telephone Lock Company of Washington, D. C.

784,557—P. T. Geyerman. Telephone Call.

Another step-by-stepper. Intended for rural districts as usual. Mr. Geyerman is from Brewster, Minnesota. Each station has a drum provided with stop pins set at intervals around a spiral on the drum. A slide across the face of the box carries a stop pin on a handle for setting at will, and on the face of the box over this handle are letters or numbers indicating the various stations on the line. When the subscriber calls another he first sets this handle over on the proper letter or number and then gives the crank of the drum one complete turn, thereby winding up its spring, setting the switch to cut in, and a detent lever holds the drum set until he presses a button which closes contact springs in the circuit of a magnet controlling a pawl working in a ratchet wheel on a shaft carrying the indicator arm and selector contact corresponding to the station. When the button is pressed it releases the drum, which revolves a distance determined by the placing of the slide handle referred to. It then stops, owing to one of its pins coming against the pin on the handle. The number of impulses has been such that the contacts on the selector at the wanted station are together, and at no other. Since no one at any other station than the one calling presses the release button, and as the contacts under this are disabled as soon as the selector ratchet commences to revolve, no one can listen in during the connection.

In the figure herewith three stations on one line are shown at *a*, *b* and *c*. *A* has called and has sent impulses to step around the selectors at all the stations to the third place. The circuit at station *c* is therefore closed through arm *40* and contact *43*, the ringer *75* being still in circuit until the receiver is taken down. The arm at station *b* is off the contact, it will be observed, and the button *55*, which at station *a* is pressed as stated to start and cut in, cannot be used at station *b* because it is disabled as soon as the selector starts.

784,588—F. P. O'Conner and F. McNeil. Party Line Selective System.

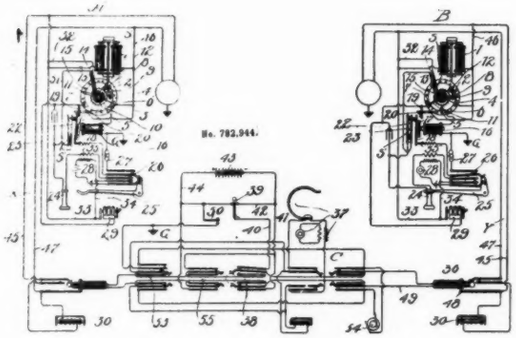
This invention is another step-by-step many-party scheme, with lockouts. As a matter of fact the apparatus looks more mechanical and is better worked out than ninety per cent of those presented. It tends to create a feeling that it will actually work, and its simplicity leads one to believe that it ought to work pretty well. The arrangement is as follows: Each station has the usual ratchet wheel which has to be turned one, two, three or more steps to close together the contacts in the talking circuit at any particular station. The stepping is done by a rather quick magnet, whose circuit is to ground through the lower contact of the switch hook. At the station calling, therefore, this magnet marked *13* in the drawing is unaffected, the hook being up. To restore the device a pair of solenoids are used, marked *54*, drawing up a yoke *55* on a long closure only, and lifting both pawls away from the ratchet wheel. To make this action still slower and surer a dash-pot *64* has its plunger *63* attached to the stem *62* of the solenoid yoke *55*. Short impulses, therefore, step the wheel around, line ones restore. When a party on the line calls in to central the operator locks all other parties out by sending a single impulse, which turns them all up one step.

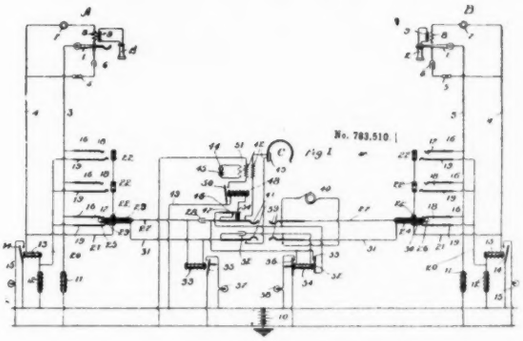
784,605—L. W. Wanemaker. Telephone Operator's Key.

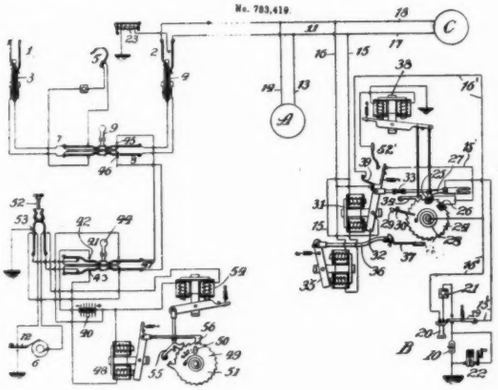
Mr. Wanemaker resides at Genoa, Illinois, and he apparently objects to what he calls "the multiplicity of flat metal springs" now usually employed in listening and ringing keys. As shown in the drawing he substitutes rocking levers *32* and *33*, with plungers *7* and *8*, each plunger carrying on its end an insulating cross-piece so that when the plunger is forced in it will come down on one of the rocking levers and change the cord circuit. Back contacts *27* and *28* are included in the talking circuit and are brought together when the plunger *8* is depressed. The entire outfit looks more like a push button snap switch for electric lights than a telephone switch. The apparatus is enclosed in a casing *5*, in which is mounted a relay *66*, and on the front of the casing is a lamp jack and lamp *57*, which the gentleman refers to as a "clear out signal." The contacts made by the relay at *64-75*, and the bell-crank mechanism by which they are worked, constitute a very curious concatenation.

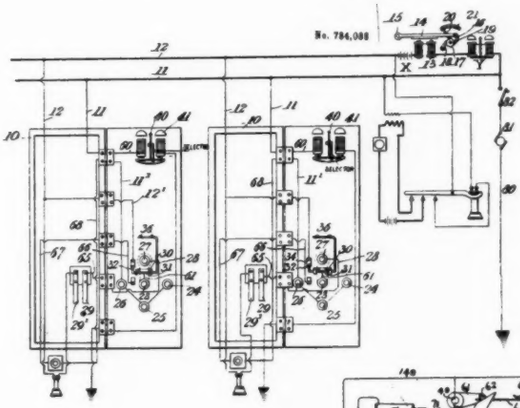
784,635—M. Setter. Relay.

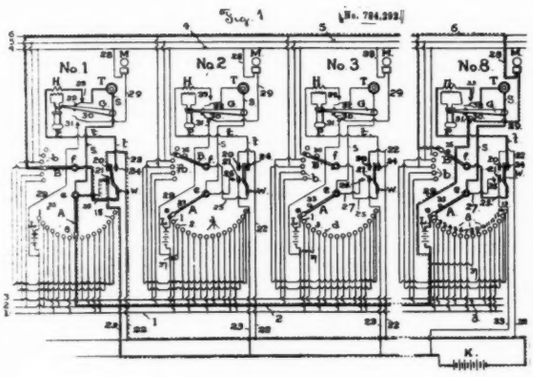
This is a tubular relay with an end disk armature hung on a knife edge across the upper part of a metal yoke fitted to the end of the magent shell. A cross bar on the yoke carries the back contact and retractile spring, while a front contact is mounted in a hollow in the end of the core of the magnet, supported on a spring fastened to the magnet head. All circuits are led to pins set in the rear end of the tubular casing, whereat also the usual projecting threaded stud serves for attachment to a rack. The armature and contacts are covered by a metal cap sprung into a groove

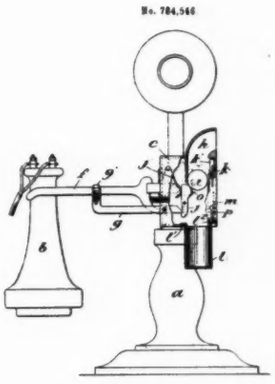

No. 782,944.


No. 783,510.


No. 783,419.


No. 784,088


No. 784,392
No. 1
No. 2
No. 3
No. 8


No. 784,546

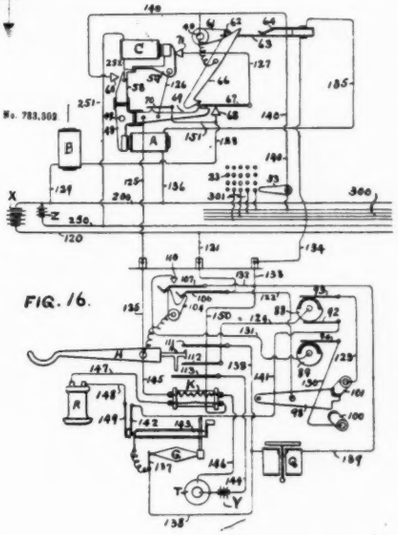
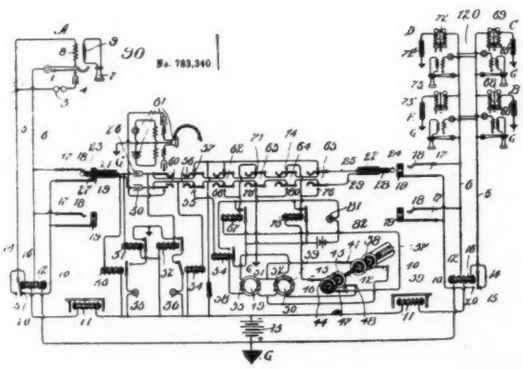
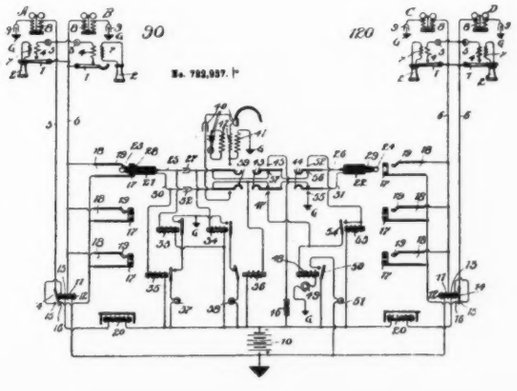

No. 783,309

FIG. 16.


No. 783,340.


No. 782,937.

around the head. The patent is assigned to the American Electric Telephone Company of Chicago.

784,720—K. Weman. Telephone Signaling Means.

This invention is neither more nor less than a buzzer at the central office connected to a key controlled by an operator at the central office so as to send an effective calling current to a subscriber's station to attract attention when the receiver has been left off the hook. The buzzer current of course produces a loud sound in the receiver. The patent will also produce a loud sound when it gets up against some of our friends who have been using this kind of a device in their exchanges for years.

784,872—R. H. Manson. Relay.

This is the Kellogg visible contact relay. The armature instead of engaging the front end of the springs, is cut away and has a cross pin that passes between the springs a little way back from the ends. The contacts are thus brought forward with nothing in front of them. The patent is assigned to the Kellogg Company.

POULSEN'S TELEGRAPHONE.

BY LEO DOLKART.

Among the many new developments in telephony, the telegraphone must receive its share of credit. Though at present it is in an undeveloped state it has a bright future.

The telegraphone is capable of recording upon a steel tape, or wire, any sounds, vocal or instrumental. The apparatus comes in two types—one reproduces the sound message into one receiver any number of times, and the other reproduces the message once, but into any number of receivers. The principal upon which this invention is built is very simple. A permanent recording magnet, whose windings are in

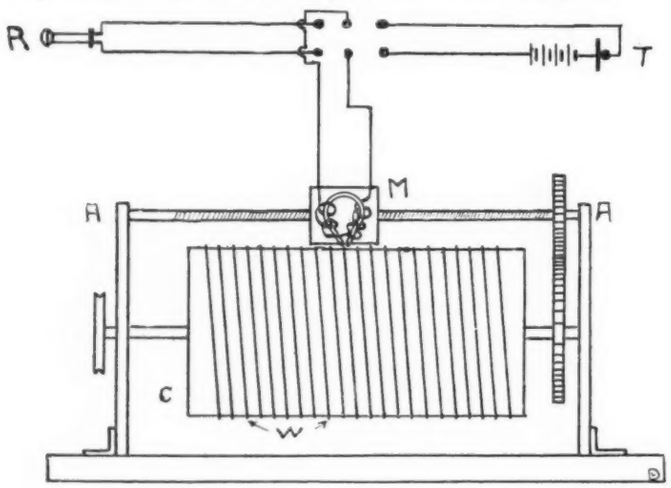


FIG. 1.

series with a battery and a recording transmitter, is placed with its poles adjacent to a movable steel wire or tape. When sounds are produced into the transmitter the recording magnet establishes upon the movable tape permanent magnetic poles whose intensities depend upon the quality, pitch and inflection of the sounds received by the transmitter. When it is desired to reproduce the sounds recorded upon the tape, the latter is caused to move adjacent to the poles of one or more permanent magnets, the windings of each of which are in series with a receiver. As the now magnetized tape moves past the poles of the reproducing magnet or magnets, each of the small permanent magnetic poles on the tape induces currents in the windings of the reproducing magnets. These currents reproduce in the receivers sounds corresponding to the original speech. When it is desired to record a new message on the wire or tape, either is caused to move adjacent to the poles of a strongly magnetized obliterating magnet, which destroys the small poles on the chain or tape. After this either chain or tape is ready for a new record.

Figures 1 and 2 show the two types of telegraphones. In Fig. 1, *C* is a large cylinder having a steel wire *W* coiled upon it, and is capable of rotation—either by means of a small motor or clockwork. The magnet *M*, moved by means of a screw along *AA*, is always in contact with the steel wire *W*. *T* is the transmitter through which the messages are recorded, and *R* is the receiver through which the message is received after being recorded on the wire *W*.

The other form of instrument (Fig. 2) consists of a steel tape *S* running on two spools *A' A'*. *T* is the recording transmitter and *M* the recording magnet. *M M M* and

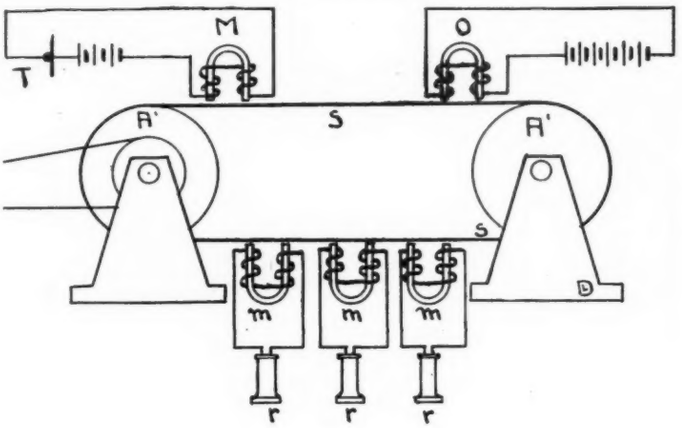


FIG. 2.

R R R are the receiving magnets and receivers. *O* is the obliterating magnet. The spools are rotated by means of a belt.

A MARVELOUS INVENTION.

The telephone that takes your speech, keeps it unuttered, if your friend happens to be out, but speaks it into his ear as soon as he returns, whether the interval be an hour or a week, is a recent invention, and must be regarded as a marvel of marvels. That machine may consist either of a steel wire wound on a revolving drum, or a hard disk revolving in a horizontal plane. Above the revolving wire or disk is placed a small electromagnet actuated by the telephone circuit. All the varying impulses that come over the telephone wire under the influence of the speaker's voice are imparted by the little magnet to the steel moving beneath it, and they make upon that steel surface a series of magnetic impressions, like invisible dots, each of which possesses its own peculiar polarity and degree of intensity.

It is just as if the steel were a sheet of paper and the magnet a pen, and the magnetic impulses a series of alphabetical signs jotted down on the paper—only nothing is visible to the eye. But the hundreds of little magnetic poles are there, though unseen, and when the wire or the plate carrying these mystic hieroglyphics is again passed under the electromagnet (the latter being now connected with a telephone receiver) they reproduce exactly the same impulses that created them, vibrate the speaking membrane and give forth the voice and the words which they had stored.

The only thing that a man who has a telegraphaphone in his office needs to do is to set the apparatus going when he has time to listen to it, and if any of his friends have been speaking to it while he was out, or busy or asleep, their messages will be repeated.

What is an Automatic Telephone System?

WILLIAM W. DEAN

I HAVE read with a great deal of interest the discussions on the relative merits of automatic and manual systems and service, which have appeared from time to time in the telephonic journals. The treatment of these subjects has certainly been thorough and able. I have also given some thought to the questions involved in these discussions: naturally to one who has devoted a great many years to the development of manual telephone systems, it is disturbing to see something which he has seen improve by a process of natural evolution to a high state of perfection, suddenly pronounced all wrong and obsolete.

All of the writers so far have apparently taken it for granted that what they have been discussing actually was an automatic telephone system. The first question which I ask myself and the telephone world is, what is an automatic telephone system? When we say automatic, to which end of the business do we refer, the subscriber's or the exchange owner's? My experience has taught me that the less the subscriber has to do the better the service and the more satisfied he will be. Let us compare the work done by a telephone subscriber in making a connection in the manual and automatic telephone systems. To be fair, we will assume that he is calling for a three number station, say No. 451.

MANUAL EXCHANGE.

(1) The subscriber places the telephone receiver to his ear and asks for what he wants.

(2) When the subscriber gets through talking he hangs up the receiver.

AUTOMATIC EXCHANGE.

(1) The subscriber places the telephone receiver to his ear.

(2) The subscriber places his finger on the No. 4 hole of the sending device and pushes the sender down to the stop.

(3) The subscriber places his finger on the No. 5 hole and performs the same operation.

(4) The subscriber places his finger in No. 1 hole and performs the same operation.

(5) The subscriber pushes the ringing button several times, or until the called for subscriber answers.

(6) The subscriber hangs up the receiver when through talking.

The subscriber also goes through all of these operations except No. 5 in order to find out that the called for subscriber is busy, say in from ten to fifteen per cent of all calls. In the manual telephone exchange all of the operations except numbers one and six, are taken care of by the operator at the central office. In the manual system something is being done for the subscriber; in the so-called automatic system, the subscriber is doing something for himself; in other words the subscriber is doing his own operating and is deluded into the idea that he is receiving automatic service. Let us consider some parallel cases. The passenger elevator may truly be called an automatic stair climber, for the reason that the passenger does not have to exert himself: an elevator in which the passenger has to turn a crank to lift himself could not be called automatic. The trolley car or automobile might be considered in the light of automatic walking machines, but we would not consider them such if the passenger had to furnish the energy for propelling them.

In the so-called automatic system the subscriber is simply doing his own operating, and does more work in completing a connection than an operator in the manual exchange would do. Let us imagine a modern central-energy system with a mechanical telephone girl in each of its positions. Now from the joints of this mechanism we will run a series of ropes down to each subscriber's telephone; by pulling the ropes in the proper order and each one the proper number of times, it would be possible to make this dummy perform all the functions of a live operator. Can you call this outfit an automatic telephone system? Much more automatic from the subscriber's standpoint would be an arrangement like the following: Equip your telephone exchange with a modern central-energy multiple switchboard and standard central-energy substation apparatus. At stated periods the subscriber could hold a meeting and draw lots to see who should act as operators for the next period. Even figuring that the subscribers would make unskilled and inefficient operators, only a small percentage of them would have to work, instead of, as in the case of the automatic exchange, all of them acting as operators.

Let us change the name of the automatic telephone system and call it the "Subscriber Operated System." The modern central-energy multiple switchboard gives as nearly automatic service (from the subscriber's standpoint) as anything can possibly be. To make this system more automatic (from the exchange owner's standpoint) is only a matter of perfecting details. It is an extremely simple matter in modern manual switchboard equipments to relieve the operator of many of her manual duties by means of simple automatic machinery. By abolishing the answering jack and ending the subscriber's line in a cord and plug the operation of plugging into the answering jack can be dispensed with. In connection with this "single cord board," automatic listening and ringing keys have been already developed, so that all the operator has to do is to say, "What number?" insert a plug in the called subscriber's jack and withdraw the same in response to the automatic disconnect signals. Among the advantages preached by the automatic apostles is "secrecy in telephone conversations." They will tell you that the operator in the manual system spends most of her time in "rubbering." Any experienced operating expert can tell you that this assertion is ridiculous, that cases of "listening in" are extremely rare, and that with modern methods of operating the operators are under strict surveillance. There have been a greater number who have listened to telephone conversations at the distributing frames and cable terminals than at the switchboard, and this opportunity exists to an equal extent in the automatic telephone exchange.

After all, a great deal of credit is due the men who have developed the automatic telephone exchange as far as they have. They have accomplished results and overcome difficulties which would have made the hair of a manual exchange advocate stand on end to merely think of attempting. As in most radical movements, our friends have gone too far and most sane engineers at present are advocating some compromise scheme between the straight automatic and manual systems. Whatever we do, let us remember that our telephone subscribers are paying for being waited upon and not for waiting upon themselves. Let us give the subscriber the least possible amount of work to do, and put all of the automatic labor saving devices at the central office, and we will have reached the condition of affairs which is best for the telephone exchange user and owner.

Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

TRUTHFUL ❧ FEARLESS ❧ INDEPENDENT

Edited by
H. B. McMEAL and H. E. BABCOCK

Published by
The TELEPHONY PUBLISHING CO.
301-336 MANHATTAN BUILDING, CHICAGO, ILL.
Telephone: Harrison 2951

H. B. McMEAL - - - - - - - - - - - President
ED. J. MOCK - - - - - - - - - Secretary and Treasurer

European Office: 36 Maiden Lane, Covent Garden, London, W. C.

TERMS OF SUBSCRIPTION:

United States, Canada or Mexico - - - - - Per Year, $1.00
Foreign Countries, within the Postal Union - " " 2.50
Single Copy - - - - - - - - - - - - - - - 10 Cents

In requesting change of address, always give the name of the post office to which your magazine is sent. Your name cannot be found on our books unless this is done.

TELEPHONY is not returnable from the newsdealer. If you desire to purchase the paper from a dealer it will be to your advantage to notify him that you will want it, in order to insure his having a copy for you. If you wish to receive the paper regularly, please send in your subscription so that we can mail it to you direct.

Change in advertisements intended for a particular issue should reach the Chicago office of TELEPHONY by the 20th of the month preceding publication. New advertisements can be received up to the 25th of the month.

ENTERED AT THE CHICAGO POST OFFICE AS SECOND CLASS MAIL MATTER

COPYRIGHTED 1904—ALL RIGHTS RESERVED.

CHICAGO, APRIL, 1905.

Table of Contents.

Concerning the Intermediate Distributing Frame—Kempster B. Miller 283-285
Increasing Revenue of Rural Telephone Systems—A. E. Tyler. 285
Canada and the Independents 286-289
Digest of Telephone Literature—Samuel B. McMeen 290-293
Independent Telephone Development (Review of Vinton A. Sears' new booklet) 294-297
Maintenance of Telephone Switchboard Cords 289-299
Powerful Reply to Bell Attack 300-301
Telephone Construction Practice—H. J. Minhinnick 302-309
Conventions of Independents 310-317
Digest of Telephone Patents—Edward E. Clement 318-324
Poulsen's Telegraphone—Leo Dolkart 324
What Is an Automatic Telephone System?—William W. Dean .. 325
EDITORIAL—
Court Decision Establishes Important Precedent 326-327
How the Kellogg May be Crushed 327-328
Soft Voice Ensnares Men's Hearts 328
The Worm at Last Turns 328-329
Bell's High Telephone Tolls Help Carry "Lame Ducks" .. 329-330
No Mail by Telephone 330
Questions and Answers—J. C. Kelsey 331-333
Reports Show Growth and Prosperity 333
In the Financial Field 334-336
Best Methods of Telephone Advertising 337-338
Annual Report of Cuyahoga Telephone Company 339-341
Decisions Affecting Telephony—G. W. Hand 342-343
Telephone in Foreign Countries 344-345
Municipal Telephony in England—Alfred R. Bennett, M.I.E.E. 346-347
Telephony in Railroad Realms 348-349
Jungle Savages Operate Telephone System—M. C. Barry ... 350-351
Telephone Tales Tersely Told 352-353
Personal 354-355
MANUFACTURERS' DEPARTMENT—
Dean Electric Company 356-364
T. & A. Selective Call System 364-365
Describes a Great Industry 365
Fills an Important Position 366
Bissell Company's New Trade Mark 366
Non-Breakable Messenger Hanger 367
Trade Notes 367-369
In the Rural Line Districts 370
Incorporations of the Month 371-372
Annual Meetings 372

TOLEDO COMPANY'S COURT VICTORY ESTABLISHES IMPORTANT PRECEDENT.

A DECISION of unusual importance, of vital interest to telephone men in general, and to those of Ohio in particular—affecting as it does directly the telephone industry in that state—recently was handed down by the Ohio Supreme court in what is known as the Toledo case, the finding of the court being a signal victory for the Home Telephone Company of Toledo. The legal action in the case grew out of the fact that the Home company increased its rates to a point in excess of the maximum allowed by the franchise under which the company was working. Its rights to increase the rates beyond those fixed by ordinance was contested by the city of Toledo. The Home company denied the right of the city to limit its rates or to in any manner legislate with respect to them. This defense was set up because the statutes of Ohio did not confer upon city councils any such right to regulate telephone rates. The city contended that in accepting the franchise and working under it it was bound as by contract to the stipulations of the ordinance.

The Supreme court, in finally determining the case in favor of the company, held that the council is powerless in the matter of regulation as to rates. As the matter now stands it is almost generally accepted that there is no power outside of the General Assembly of that state to regulate these rentals, and that the operating companies are authorized to charge a sufficient price for service. In other words, while cities and Probate courts may grant franchises they cannot by agreement or otherwise say what amount shall be the maximum for rentals or in any other way regulate the operation of the exchanges.

The meaning of the Supreme court's decision has been made clear by the publication of the following syllabus in the case:

1. In a proceeding instituted in the probate court by a telephone company, under the provisions of section 3461, Revised Statutes, which authorize and require the court to direct in what mode such telephone company may construct its lines along the streets, alleys and other public ways of a city or village, the court has no jurisdiction, as a part of its order, to prescribe or determine the rates to be charged citizens of the municipality for the use of the telephones, and so much of the order as undertakes to determine such rates is void for want of jurisdiction.

2. In such an action in quo warranto to oust the telephone company from the use of the streets, alleys and other public ways in the mode directed by the probate court, on the ground that such company has established rates for the use of its telephones exceeding those prescribed by the court, on the application of the company, the latter is not estopped from questioning and denying the jurisdiction of that court to prescribe the former or any rates.

Justice Price, who wrote the opinion in the case, has issued the following statement:

The Toledo telephone case involved the right of the probate court of Lucas county to fix and establish rates for the use of telephones of the company within the city of Toledo. This was the only question involved in the case decided, and it did not involve the power of the city council to agree with the telephone company regarding such rates.

It is within the powers of the council to fix and establish rates for the use of telephones in an ordinance under which the company may exercise its franchise within the city, but the probate court has no such power to establish rates for the use of telephones, but it has the power to prescribe the method of use of the streets by providing how the poles shall be located, etc.

It is evidently the intention of the court to pass only upon the right of the Probate court to fix rates. Attorney-General Ellis of Ohio asserts that the Supreme court has already passed upon the right of municipalities to regulate rates and that its decision was adverse. Quoting from the record of the court Mr. Ellis shows that in the famous Zanesville case in which Senator Foraker appeared for the telephone companies, the court held that the state alone has the right to grant such companies the right to use the streets of a municipality. The council or other legislative body of

the municipality has the right to prescribe the method of use such as the erecting of poles, laying of conduits and the stringing of wires.

This foreshadowed the decision in what is known as the Findlay case, which goes to the very root of the matter. In Findlay a company was given a franchise by the city council, the rates being prescribed in the ordinance. Later the claim was set up that a miscalculation had been made and that the rates were too low. Original subscribers were given the low rate, but those coming after were charged a higher price. The matter was taken to court through an effort to oust the company for a violation of the ordinance. The Circuit court held that the municipality has no right to fix the rates for tolls and was limited only to a prescription of the method of the use of the streets under the franchise. On appeal the Supreme court upheld the Circuit court, but did not report the case, so that the written finding of the lower court is the law upon the subject, having been accepted in its entirety by the superior body. This decision was most sweeping, the court going so far as to hold that the city could exact or receive no compensation of any kind under any guise for the use of its streets.

In the Toledo case the franchise of a Probate court was challenged upon the same grounds as in the Findlay case, and the court has held that there was no right to fix rates, even though there had been an agreement which was the basis upon which the franchise was issued. These three decisions, the Attorney-General holds, are harmonious, and there is not a vestige of authority lodged anywhere for the fixing of these rates. He further says: "I have no doubt but that the coming General Assembly will recognize this remarkable situation and that suitable legislation will be enacted to meet existing conditions. The state has the power to establish rates, but they must be reasonable, so as not to transgress the constitutional inhibition against the confiscation of property. This will, no doubt, be an easy task for the lawmakers to perform when the time comes."

The decision of the Supreme court does not sustain Mr. Ellis in his views, neither does it disagree with him, for it explicitly declares that the matter of municipal regulation is not passed upon. It does, however, agree with him in his declaration that further legislation is necessary, indicating a confused condition of affairs in this vital public situation.

City Solicitor Denman of Toledo made an effort to get a rehearing of the case, but failed, the Supreme court informing him that the issues had been squarely met, and that a reopening of the case would avail the city of Toledo nothing. While in Columbus, the solicitor learned that an important part of the court's reason for its decision was the admission of the telephone company that it made an error of judgment in specifying rates, in its application for a franchise to the Probate court. On this ground, Mr. Denman asked leave to file an answer, and have this issue referred to a referee, to determine what would have been a fair rate for the company to charge when it began business.

Smith W. Bennett, special counsel, with Attorney-General Ellis, who assisted the Toledo solicitor in the case, sent the following letter to the city legal department:

Hon. U. G. Denman, City Solicitor, Toledo.

Dear Sir—Upon request made by Mr. Ellis, I have applied to the chief justice, Hon. William Z. Davis, for leave to file a reply in the case of the State, ex rel., Attorney General vs. Home Telephone Company. He sends me word that such leave was refused without a dissenting vote. The reason of this action is that in considering the demurrer to the answer, the court went back to the petition, and holds that the probate court is without jurisdiction to make an order as to the rates or to represent the city in a contract as to rates, all of which will fully appear in the opinion being prepared. For the reasons stated, the court has rendered a final judgment in the case, and it would do no good, according to the chief's statement, to file a reply.

Very truly yours,
SMITH W. BENNETT, Special Counsel.

Had the request of Mr. Denman been granted, another hearing in the Supreme court would have been ordered, but the emphatic action taken by the court knocks out the last support from the city's case, and the telephone company wins an unconditional victory.

HOW THE KELLOGG MAY BE CRUSHED.

THE ownership of the Kellogg company by the Bell company is a well known and admitted fact in both Bell and Independent telephone circles, and Independent buyers having the best interests of the cause at heart will religiously shun the Kellogg when it comes to the matter of selecting telephone apparatus. The Kellogg company being owned by the Bell, its profits from the manufacture and sale of telephone apparatus and supplies, therefore, go to the Bell company, and can be and are used by that company in carrying on the fight against Independent telephony.

Without further argument it would seem foolish—the very worst kind of policy, in fact—for new Independent telephone company to purchase Kellogg equipment. New companies, as a matter of fact, are *not* purchasing Kellogg equipment, except in rare cases, where, for lack of competition, the truth of the situation has not been developed. All telephone purchasers, however, cannot be classed in the list of new companies, as the number of telephones and switchboard sections sold to established exchanges far exceeds the number sold to new companies. Some of the established exchanges began with Kellogg equipment, when the Kellogg company was supposed to be Independent. They feel that they must have Kellogg parts for their switchboards, and they do not see the necessity of antagonizing the source of supply by withdrawing their patronage. ,

There are many such companies. It is absurd to say they are not Independent. *They are.* They have the interests of Independent telephony at heart, but cannot see their way, under the circumstances, to drop the Kellogg. What are they to do? In the first place it is well to remember that in the telephone trade the basic patents have expired. Any manufacturer, therefore, can and does practically duplicate anything made by a competitor for which there is a demand. If these users of Kellogg apparatus will correspond with Independent factories, stating precisely what they want, we will undertake to guarantee that no factory will receive more than three inquiries before its force of die-makers will be busy on tools to manufacture those parts which the trade demands. Thus, established exchanges using Kellogg apparatus can free themselves from the grasp of a Bell concern and the necessity of supplying the enemy with the sinews of war. .

So much for individual exchanges. What about associations, state and national? These associations have fought the Bell from the beginning and realize how dangerous an enemy it is. They cannot afford to give it a single advantage. If they can lessen the revenue of the Bell company in *any way* it is their duty to *do so.* All such associations should, therefore, take action at their next meeting, looking toward the diverting of all Independent patronage from the Bell company. The way should be pointed out whereby users of Kellogg apparatus may create a source of supply that truly is Independent. Resolutions should be adopted which will force the issue and cause users of Kellogg apparatus to seek and find a new source of supply, and continuing to patronize the Kellogg, in the face of the evidence at hand, these companies should be deprived of the benefits of Independent association and made to understand the inconsistency of their position. In no other way can the enemy be prevented from foraging in the Independent field.

The words of St. Matthew apply with particular force in this case, and should be carefully considered by every Inde-

pendent user of Kellogg apparatus: "No man can serve two masters; for either he will hate the one and love the other, or else he will hold to the one and despise the other."

Every Independent who is not loyal to the cause is his own worst enemy—he is digging his own grave.

SOFT VOICES ENSNARE MEN'S HEARTS.

WHY does a prosperous young farmer go into a telephone office to get a wife? Down in Aurora, Illinois, recently, a wealthy young soil tiller of Bureau county went into the office of the Inter-State Telephone and Telegraph company to transact some business over the wire. He was alone with the night operator, and before he had left he had proposed to her, offered to give her everything she cared to have, and would take her to one of the finest farms in his county. He didn't want her to be a farm slave, but to be the wife of a country gentleman. This girl told him to call the next day, and when he did so he found the day operator on duty. He made up his mind that if the night girl would not be his wife, he would ask the pretty young day worker—and besides, there were a whole lot more upstairs that he would try to see.

It was ascertained that this young man owned in his own right a half section of land that was worth $100 an acre, that he was an up-to-date farmer, came from a good family of farmers, and was possessed in all of property that would enable him to retire in ten years. During the time that he was in the telephone office he asked the kind of questions that showed he had good ideas about picking out a wife.

The Aurora incident is but a single one of hundreds of the same kind. Farmer boys are falling in love with the sweet-voiced creatures who are continually singing the same song over the wires. Some people think they do not have much more time than to say "hello" and "busy," but many of them talk themselves into a wedding. Talk is the right word in this connection, for it is the sound of their voices that infatuates a young man at the other end of the wire.

Manager Clapp of the Aurora office, one of the oldest and most experienced telephone men in the middle west, says there is something about the sound of the voice of a girl on the wire that sets a young man into a wooing mood. He says that a girl who has lived through her teens without a proposal will enter a telephone office and before she has been at the board a week "some young man will want to marry her." It is claimed that the country telephone exchange is a veritable recruiting office for marriageable young women. The great web of wires that belong to every station of this kind seems to have been spun by Cupid himself, and he liberates any who have been caught only when he finds someone to take care of a good wife.

Within the last five years thousands of girls have found employment in the country or the Independent telephone offices. There are lines that connect up a score or more of small towns with the larger towns. Then there are hundreds of lines that are operated by farmers almost entirely. The lines of one company connect with another so that one may talk clear across the state. The exchange of a country town sometimes has all the way from 200 to 500 subscribers. A single Independent line may have 15,000 subscribers.

Within the last two months the director of the climate and crop service, department of agriculture, at Springfield, Illinois, began agitating a project to send weather reports to these telephone companies, so that they could relay them to a large number of people free of charge. In a short time he had favorable responses from telephone lines that represented 118,690 telephones in 440 towns, and on thousands of farms. This shows the wonderful scope of country over which a pretty girl may say the tender little things that sound all the sweeter on the wire, and which seem to have occasioned so many weddings from real love matches.

THE WORM AT LAST TURNS.

THE Chicago (Bell) Telephone company evidently has reached the end of the string in its peculiar and evasive dealings with the city of Chicago. For months the authorities have been haggling with this big and insolent corporation, seeking by every ordinary legal means to force it to pay to the city the large sum it owes the municipality, according to the plainly stated provisions of the franchise, but all to no avail. The company, through its cunning attorneys, has resorted to every subterfuge and means to embarrass the city in its attempts to collect what is justly due it, and, if possible, through some hook or crook, to escape paying its bill of thousands to Chicago. The big city by the lake has had its patience taxed to the utmost, until that virtue at last has become exhausted, and now it has donned its fighting clothes and is going after the law-breaking Bell company with a sharp stick. Its first step in this direction has just been taken by Corporation Counsel Tolman—the beginning of drastic proceedings which Major Tolman thinks will bring what he calls "this recalcitrant corporation" to time. He has asked State's Attorney Healy to bring a suit in *quo warranto* against the Chicago Telephone company to settle summarily all the disputes the municipality has with the company.

The telephone company's immediate offending is its persistent failure to file with the city controller the report which its franchise ordinance requires. Back of this, however, is the refusal of the company to pay to the city what the municipal authorities consider the full percentage of its gross receipts required by the ordinance and its persistence in demanding tolls for connections inside the city limits. The company hearing of the application for the *quo warranto* suit at once began to beg for time. It represented to the state's attorney that it would like to file a brief with him, setting forth its side of the case, before he signed the application for the writ, and he accordingly gave it several days.

The city now has a suit pending before Judge Windes of Chicago to recover what it considers its rightful share of the gross receipts of the company. It was the action of the company since the filing of this suit which led the corporation counsel to make this most important move. Under its franchise the company must file with the controller every six months a report showing its receipts for the previous half yearly period. According to the ordinance the city is entitled to three per cent of these receipts. The company asserts that this clause means three per cent of the receipts gathered in the territory included in the city at the time the ordinance was passed. The city claims three per cent of all receipts gathered inside of what are now the city limits. It was for a determination and accounting on this point that the suit in Judge Windes' court was brought.

The first report after the filing of this suit was due January 1 last, but as yet the controller has seen nothing of it, neither has the company shown any disposition to file one. It was primarily to bring the corporation to time on this point that *quo warranto* action was decided upon. But *quo warranto* is a broad proceeding, and under it a corporation can be asked not only by what warrant it is doing business but *how* it is doing it. *It is the writ employed when a corporation suspected of doing an illegal business is inquired into.*

In the case of the Chicago Telephone Company there has been a constant dispute between it and the city as to its right to charge tolls for connections entirely inside the city limits. When these toll lines were established the localities

to which they ran were outside the city, but they have since been included. To-day the company charges an extra dime for a connection with Englewood, Kensington, Rogers Park, South Chicago, Pullman, West Pullman, Jefferson, Austin, Chicago Lawn, and Irving Park, all nearby suburbs, and some of them as much a part of the city as the district within the downtown "Loop."

The claim of the company that it has a right to charge these extra tolls is based on the same assumption which leads it to deny to the city any percentage on its gross receipts not collected inside the old city limits, namely, that it is acting under several ordinances, one being granted by the city and the others by the villages which the city afterward annexed. The city recognizes only one ordinance, its own, and claims that covers the entire territory inside its present limits.

"There has been a continual dispute as to the obligations and duties of the company under the ordinance," said Maj. Tolman in speaking of the proposed *quo warranto* suit to TELEPHONY. "The council appointed a committee to negotiate with the telephone company and the law department has done its best to come to a friendly settlement, but the only result was a law suit. But even when we got into the courts the company employed such obstructive tactics that we became convinced we ought to employ more drastic methods by which results of a more summary nature could be obtained. Since the suit for an accounting was filed the company has refused, or least entirely neglected, to make any statement of its receipts in any part of the city whatever. It evidently is time that something was done."

Here is an edifying spectacle, and one not calculated to inspire in other corporations or individuals a respect for the ordinances of the city or for franchise rights—a rich, gigantic, money-making corporation, in possession of a franchise worth millions, deliberately and persistently seeking through some legal technicality a loop-hole to wriggle out of paying the city of Chicago what it solemnly agreed to pay when it was granted a franchise. However, there is nothing surprising in this. This sort of thing has become so characteristic of the Bell, through years of brigandage and preying upon the public, that it has come to be looked for as a matter of course. However, once in awhile the law triumphs over the "octopus," which causes a howl to go up from Boston that can be heard at Golden Gate. It is fervently to be hoped that the law-dodging Chicago Telephone Company will be made to toe the mark in this instance, and brought to time with such a sudden jerk that it will at least make an effort to "be good" in the future. The best wishes of all decent, law-abiding people are with Major Tolman and the city of Chicago in their combined effort to teach a hoggish, law-breaking corporation a much-needed lesson in living up to its agreement.

BELL COMPANY'S HIGH TELEPHONE TOLLS HELP CARRY "LAME DUCKS."

THROUGH the New York press, S. P. Sheerin of Indianapolis and other telephone experts in the Independent field recently have called attention to the fact that by the exaction of oppressive rates the prosperous telephone companies of the Bell combination, notably the eastern licensee companies, such as the New York and New England companies, are enabling the parent monopoly to save from utter financial collapse the weaker licensee companies of the west, which are being desperately pressed by Independent competition. Mr. Sheerin has told how the Central Union Telephone company, the particular tentacle of the Bell octopus operating in Ohio, Indiana and portions of Illinois, with an outstanding capital of $5,450,877, has had to carry a bonded indebtedness amounting to $6,000,000, and *has not paid a dividend for many years.*

There are a number of such "lame ducks" among the forty-three licensee companies of the Bell aggregation, but the beautiful system of that monopoly enables it by mulcting the more prosperous companies of the group to sustain the weaker ones, which if left to their own fate would long ago have succumbed to competition. Not only does each of the forty-three licensee companies pay a yearly royalty to the present concern—the American Telephone and Telegraph company—for every transmitting and receiving instrument of the hundreds of thousands employed, but the parent concern maintains in each a predominance of interest and absolute control by holding not less than fifty-one per cent of the capital stock of each of the forty-three subsidiary corporations of the trust. The aggregate of those stocks held by the parent company, according to the figures supplied to the United States Census Bureau for 1902, was $103,381,528, or just about fifty-one per cent of the aggregate outstanding capitalization of the forty-three subsidiary companies.

One of the beauties of this highly centralized system of control is that a "lame duck" company, crippled to the verge of bankruptcy by well directed competition, may raise money to sustain itself by a new bond issue, and if the public does not clamor to take up the bonds the parent company or some of the richer of the licensee companies which have not yet suffered serious competitive invasion of their territory stand ready to do so in order to preserve the integrity of the whole monopolistic structure.

According to the same government source—the census bureau figures for 1902—bonds owned by the American Telephone and Telegraph company in certain of its licensee companies amounted to $2,141,000, while stock owned by licensee companies of the monopolistic group in other licensee companies of the same aggregation amounted to $9,319,960. The scheme recently exploited from Pittsburg, which told of plans for the corporate "consolidation" of most of these licensee companies was in the opinion of well informed financiers, nothing but an adroit move so to unify them as to permit the execution of a blanket mortgage with new bond issues to secure it, and thus to lure investors to the aid of the weaker and non-self-sustaining companies by giving to the bonds the supporting credit of the richer, self-sustaining and dividend-paying licensee corporations of the Bell company.

And the pertinent relevancy of all this is that the Bell company's excessive charges in New York city and elsewhere are indirectly helping to fight the trust's losing battles in the west and to sustain the weaklings, which, without such help, would have succumbed ere now to live competition. In Michigan the Bell company has been pressed even harder than in Indiana, and actually was sold recently under foreclosure. In 1902, according to census figures, its authorized capital was $10,000,000, its outstanding capital stock was $5,000,000, while its outstanding bonded indebtedness amounted to $5,594,400, which included $504,400 in bonds issued by the Detroit Telephone company. Joseph B. Baker of the American Institute of Electrical Engineers, who for eight years was associated with the Bell companies, who was afterward a consulting electrical engineer in Boston, and who is now filling an important post with the General Electric company in Schenectady, New York, said recently on the Michigan failure:

"The sale of the property of the Michigan (Bell) Telephone Company, under foreclosure, and its purchase by the committee of the bondholders, is an instance that, in connection with the history of the Michigan telephone securities in New England, calls attention to the inroads of competition by Independent telephone companies. The ten million dollars spent by this Bell licensee company in Michigan produced a property which sold at auction for $4,100,000. This is an extraordinary shrinkage, but one that is perfectly to be accounted for. It is not that the people of Michigan

are not using telephones. They are using them more than ever. It is plain that during a long and costly struggle the paying patronage of the Michigan telephone public has *largely gone from the old monopoly to the opposition telephone companies.*

"After the expiration of patents, held by the Bell company, that had up to that time inhibited all competition in the commercial transmission of speech, the first Independent telephone companies were started in Michigan. It was soon made clear that the Bell company would make every effort to repress these would-be competitors in the immensely profitable field that had been its exclusive monopoly. A comprehensive and in the end disastrously expensive policy of discouragement was inaugurated by the Michigan Telephone Company. The hitherto unquestioned proposition that the Bell company could not be successfully opposed was to be maintained, now that patent protection was no longer available, by an overwhelming demonstration of complete possession of the field. The making good of this expression of the old dogma of inviolability meant, on this particular battleground, heavy and continual expenditure in new construction all over the state, to anticipate all future demand for telephones and in the cutting of rates to such an absurd figure, for example, as twenty-five cents per month.

"Opposition was to be wiped out; it was to be let have no foothold. An amusing incident showing the efforts made by the Michigan Telephone Company to build up their list of subscribers at nominal rentals, and in very many instances at no rental at all, occurred at Grand Rapids. An official detailed by the Board of Charity to investigate the appeal of a destitute family found the case so urgent that he made up a list of provisions which he said he would order at the grocer's on his way downtown, whereupon his attention was called to the telephone on the wall, which he was asked to use in order to save time.

"This determined policy of extension of Bell service with no sober relation to the natural demand and regardless of revenue, a reckless course of procedure in itself, soon led as a matter of course to general extravagance. The millions in bonds and the millions in increased stock issues, 'unloaded' on bankers accustomed to regard Bell securities with the utmost favor, provided the means for this attempted campaign of extermination. The forced sale of the property at the concerted instance of the bondholders casts a flood of light upon the wide heralding of 'extraordinary telephone development' in Michigan, which will be recalled as accompanying the offering of these securities.

"The action of the bankers—who, at that time, in accordance with their custom, recommended these securities to their customers—in buying in the property for the benefit and at the instance of their customers occurring as it does in Boston, the very home of the Bell company, is significant of a new departure in the attitude of the financial world and still more significant of the scope and effect of competition in the telephone service, presenting as it does the spectacle of a Bell operating company once serving the whole of an important state under a cloud along the road to failure.

"This conflict, begun some nine years ago between the Bell monopoly and opposition companies, the scope of whose competition, 'boosted' in its growth everywhere by a generous force of public confidence, has attained an extent and character far less well realized in New York and New England than elsewhere. Other instances, integral parts of this same situation in the high financial history of the telephone service under competition, are concerned with the history of the Central Union Telephone Company, the late Erie Telephone Company and the latter's successor, the Western Telephone Company. 'I know of no more undesirable and deplorable asset than a discontented, complaining and hostile public,' said C. S. Mellen, president of the New York, New Haven & Hartford Railroad, referring to railroad policy recently, 'and it is true and applicable as well to telephone corporations, since these also undertake to serve the public with a traffic.' "

NO MAIL BY TELEPHONE.

THE latest "Postal Guide" contains a ruling by the authorities at Washington which forbids postmasters to answer inquiries by telephone regarding mail matter in their office. Here we have an intimation that the telephone has been put to a new use. It has been pitted against the mail carrier and has outdistanced him.

The practice of calling up the postmaster and asking if there are any letters for Thomas, Richard or Henry must has grown to considerable proportions before Uncle Sam found it necessary to step in and place his veto upon it. In fact, it was found that not only were inquiries about mail made over the wire, but requests came to the postmaster to read postal cards and even letters to the persons at the other end of the line.

The average postmaster is not seriously overworked, but it would be possible to keep even the least busy of them laboring overtime if he were called upon to deliver his mail by telephone. As he would have to decipher all sorts of puzzling chirography, he might make blunders in his reading that would subject him to unpleasant interviews with his neighbors. And while he was transmitting a batch of mail to Mrs. So and So, Mr. What's-His-Name at the wicket might be filling the air with unkind remarks due to the time he was required to wait for a two-cent stamp.

Looking at the question from all its angles it is difficult to see how Uncle Sam could have done anything else than to forbid the innovation. It might be a very handy and pleasant arrangement for those who do not care to walk to the postoffice or to wait for the carrier, but it would be tough, exceedingly tough, on the poor postmaster.

MAY ADOPT PROFIT-SHARING PLAN.

It is not improbable that at an early date the Toledo Home Telephone Company will consider the profit-sharing plan for its employes, says the Toledo Journal. The matter has already been informally talked of by the board of directors, but nothing officially has been done and probably will not until it is further seen what will be the outcome of the plan as adopted by the Cuyahoga Telephone Company of Cleveland.

Said Robert E. Hamblin, secretary of the Toledo company: "The outcome of the Cleveland plan has been watched closely by telephone companies throughout the United States. The profit-sharing plan is something new in the telephone business and every Independent company is naturally anxious to see what the outcome will be. Our board has talked the matter over casually and it is not improbable that it will come up for official action some time in the future . I believe that the members of the board are in favor of it if it is shown to be a good thing and the experiment in Cleveland so far seems to indicate that it is."

The profit-sharing plan was introduced into Cleveland about two years ago and to date over $16,000 has been divided among the employes. So satisfactory has it been that President Dickson recently announced that it would be continued indefinitely.

The Toledo Home Telephone Company is in the best of condition. A large number of telephones have been added each month since the plant was put into operation and just now the company is planning to increase the scope by the installation of a large number of additional cables. The new switchboards which were put into position several months ago will provide for the needs of the company for some time to come.

Questions and Answers

Conducted by J. E. Kelsey, Purdue University, Lafayette, Indiana

We have a county telephone system, with nearly 1,000 subscribers. Lately, there has been talk of running an interurban line through the county, along a road most thickly occupied by our wires. I understand also that this interurban system will make use of alternating current on the trolley wire, and I have been given to understand that when alternating current is used, with a grounded rail return, much trouble may be expected on neighboring telephone lines, no matter how well transposed. Is this true? If true, why will an alternating trolley wire be any worse than a direct current trolley wire? I know of many companies operating lines in parallel with the direct current trolley, and which experience very little difficulty. If there is trouble on my lines in their present condition, what remedy is available? If there is no physical remedy, is there a legal remedy?—F. H. M., Indiana.

Some time ago I called attention to the possible troubles to come from the alternating current trolley wire. The idea is not novel, but its application has never been seriously considered. But since the series alternating current motor is entirely successful, there is no doubt in my mind that telephone companies will find just as much excitement as they did with their old grounded lines, when the electric street railway, with its grounded return, became a settled fact. And to cap it all, the telephone interests sued the trolley company to make it get off the earth, but a wise judge could not see it that way. And now assuming that this new alternating current condition will be as widespread as the old grounded trouble, the chances are that suits will be instituted, but it is a sure thing that in this world of progress the courts will not throw one thing in the way of the alternating trolley.

As to a physical remedy, let us go back. To avoid earth currents, from the rail return trolley, the telephone company had to put its lines on a metallic basis. But it was found necessary to transpose the lines, in order to be free from the "through the air" effects, or induction. As the world grew, the metallic line was found to be lacking somewhere, which was in the idea of balance. That is to say, each side of the line must have the same resistance, and the wires should have the same size, so that each wire would present an equal condition to the inducing or disturbing wire. I remember but a few years ago of the surprise caused by discovering that the ten-ohm cord relay of the Bell common battery cord circuit would unbalance a line and make it noisy, if it were long and paralleled by a trolley wire for a great distance. If the lines are transposed and well balanced—let us say, exactly balanced—the only thing left is to look to our insulation. Insulation has never been considered a prime factor. I mean by this, real insulation. Of course, telephone insulation is a doubtful quantity. We put a dozen miles of wire on insulators, carefully tie them, and then run into a building, with ordinary insulated paired wire, even using cleats, and think that we have good insulation. Such insulation is good enough and works nicely. But so far, telephone lines have never been normally subjected to break-down strains—that is, to be possessed of charges of electricity which have a desire to go to earth, and which will find a way to earth, unless great precautions are taken to prevent them. We will assume that the physical remedy is good insulation—such insulation as high tension electric power companies use—real insulation.

First, I want to tell of specific cases, where this grounded alternating current condition existed, due to accident, and the trouble it caused. If such accidents cause trouble, it has seemed plain to me that deliberate conditions of the same character will have the same effect. I will first refer to a condition connected with an old favorite experimenting ground of mine, Minneapolis and St. Paul. When the New York Telephone Company considered the change from local battery to common battery, the natural conservatism of the east asserted itself. Minneapolis had bought a common battery system, just as the boys trade knives, "sight unseen," and nobody was absolutely certain that it would work as it has done. Well, it did work, and well, too. After it worked well, under the worst inductive conditions in the United States, it became a good experimenting ground. It was known to the telephone engineers a long time ago that such conditions as described in the question would cause trouble to telephone lines. Before installing a common battery telephone system in New York, the engineers made a test at Minneapolis, to see if a grounded alternating trolley condition would render the system harmless. The test did not show any trouble, because the power mains were underground. The reason for this will be shown later.

The next condition I saw was in East St. Louis. During a storm, one of the three-phase power wires fell to earth, and established exactly the conditions of a 2,000-volt alternating current grounded return trolley system. That it caused much trouble is a fact. It made the telephone lines disagreeably noisy. It made the telephone people "crazy," in ordinary language. Their lines were metallic, well transposed and balanced. The insulation was just the good average of all lines. When the grounded alternating condition was removed, the lines became instantly quiet. These lines all paralleled a direct current trolley and were absolutely quiet. Yet with a grounded 2,000-volt alternating current trolley condition, out they went. Why? Inductive effects are alternating in character. If the direct current trolley system had very many cars the changes in current and pressure in the feeders are comparatively slight. Even one car does not cause much noise in the telephone wire. If one listens, he can hear the acceleration of the motors, due to changes in the effective pressure acting on the motor armature. With ordinary conditions, the change is slow, and never ranges more than from zero to twenty volts. If alternating current at 500 volts is put on the trolley, the pressure changes regularly from zero to 500 volts, hence one could expect to have the generator exert its full force in inducting charges on the telephone wire. It would seem then that 500 volts alternating would be twenty-five times worse than direct current. But this effect can be neutralized by judicious transposition. Normal insulation can handle 500 volts static strain.

A prominent engineer has described the static induction effect of clouds in this manner. Suppose a cloud, heavily charged positively, approaches a line. There is induced on the wire a bound negative charge, and a free positive charge. If the cloud moves up slowly, the free positive charge will have time to escape through the natural leakage of the line. But if the cloud moves up swiftly, the free positive charges accumulate, because the leakage cannot carry them away swiftly enough, and thereby attain a high potential, and jump through the insulation to ground. If the cloud suddenly discharges, such as lightning, the negative bound charge is set free so suddenly that the leakage cannot carry it off, hence a charge accumulates with such high potential that the insulation is disrupted.

Alternating current on the trolley wire acts on the telephone wire a great deal like the passing cloud. As the pressure on the trolley wire rises from 0 to 3,000 in this case, say positive, it induces a negative bound charge, and free positive charge on the telephone wires. The free positive charge escapes without accumulating, and when the

pressure dies to zero, the bound negative charge likewise escapes. From this reasoning a leaky line would be advantageous. But if the insulation were perfect, the rise of trolley positive potential would cause the potential of telephone wire to rise from zero to 3,000 volts also. The free charge cannot escape, and as the trolley pressure died to zero, the freed negative potential would neutralize the free positive. Hence, a perfect insulation cannot be harmed. And we know that a line, in order to allow the charges to flow off as swiftly as they are induced, would have to be grounded all over; hence such a line would not be operative. The only line possible is the happy medium, or fair insulation, with insulation distributed all along the line. Distribution, equal throughout, cannot be attained. It is like a bridge set of piles, which can carry certain loads safely. Each time of crossing suppose the load be increased. The weakest pile will go first, when the load reaches its breaking down point. Nor could a chain be built which would make all links break simultaneously. One link would surely break first. The telephone line carries its present load nicely. Each insulator does its duty. But when this line is subjected to an overload, like the bridge, or the chain, the weakest part of the line will go first, and in the case of the telephone line, some one insulator would break down before 500 volts was reached, hence the line would become unbalanced and the line noisy.

Consider the trolley at 3,000 volts. With fair insulation, suppose the charges could leak off, so that but 1,500 volts could be effective. Question yourself. The toll line is separated from the common battery exchange ground by a repeating coil or condenser. We all know that condensers will not stand 500 volts pressure. The present arrester will break down. And what would happen if the cleated subscriber's line is connected to a toll line subjected to a great static strain. It will break down and spoil the balance of the connection. On the other hand, take a perfect local line connected to a perfect toll line, under great strain. Does it not look reasonable that the subscriber is in danger?

About a remedy. The system at Minneapolis was not troubled, because the grounded trolley condition was underground. The St. Louis condition was noisy, because all wires were overhead. The remedy—either put the trolley wire on a level with the earth, as a third rail, or put the telephone wires underground. Or the telephone lead could be surrounded by grounded wires, and the lead put at earth potential, from the static standpoint. By making the telephone leads at earth potential, it looks is if lightning troubles would be eliminated. The new Cincinnati-Indianapolis system uses 3,000 volts on the trolley, and the results will be eagerly watched. I am not a prophet, and only want my readers to keep their eyes open, and be kind enough to report such cases. The Independent interests will be benefited by any pooling of knowledge of conditions. There is much known by the telephone engineering fraternity. I call it fraternity, because the information is kept secret. It is to the shame of the telephone interests that this information is under lock and key.

In the February TELEPHONY I saw an article from a South Dakota man, in which he says they run branches of grounded lines connected with metallic. In what way are they connected? My experience has been with the repeating coil, and I am not able to ring through the coil. Will you please explain the mode of connecting, and if you can ring through on the lines connected? And if not, is there any way that a grounded line and a metallic line can be arranged so that you can ring through? We use 1,600 bells.—E. B. S., Wyoming.

Having loaned my TELEPHONY, I have been unable to review the South Dakota article. It is a safe proposition that, if he can connect without a repeater, there are some unusual conditions. As a general proposition, a repeater is required, and coils can easily be made that will ring through just as effectually as if straight. I have coils in my laboratory that will not even give to the fingers a feeling, with one side connected to a powerful generator. They are for transmission only. I have other coils that pass over ninety per cent of the energy through. Of course, they are large coils, with considerable iron, and a great many turns. At the low frequency of twenty cycles, or under, the coil must have turns and plenty of iron.

I have run across an inconvenience in the telephone service in my office. We have here, as you possibly know, an automatic system, in which the men say it is impossible to keep the bell from ringing when any party telephone on the line tries to call a number. If I try to call a number on my telephone in the private office, the bell out in the reception room always rings, usually causing one of the clerks to cut in, and when they discover the true conditions, they hang up, and thereby cut off the connection. Can you give me a remedy for this inconvenience?—C. G. M.

On the party lines of the Strowger, the other bells always tap at each impulse of the sender. If a person is a quick sender—such as Mr. Crook, for instance—I have no doubt that the party on the line would be certain that the bell rung, even if he is accustomed to the condition. There is no way that this trouble can be obviated electrically. If the offices are close it could be done mechanically. The bell circuit of the reception office could be opened, attached to a pair of wires, which could be run to the private office, and there terminate in a switch, which could be opened when the private office dial is operated. If the reception office bell is the only bell, you would be likely to leave the switch open, and not hear calls. A push button scheme could be arranged, so that you would make the closing of the bell circuit an unconscious act. Or the hook switches could be mutually arranged, so that the removal of either receiver would open the bell circuit of the other. But I must be careful, or the Automatic Electric Company will be paying me royalty on this scheme.

On page 180 of "Experimental Electricity," by Edward Trevort, is given the working drawings of a slide wire bridge, it being forty-two inches long. I wish to construct one half as long, and have the

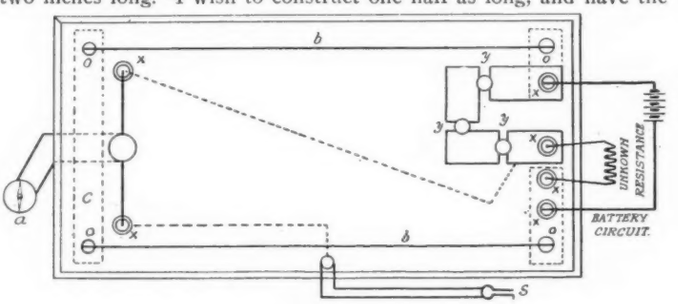


FIG. I.

A, galvanometer, or receiver; b, slide wire with scale underneath; o, posts supporting slide wire; x, binding posts; y, variable resistance of known ohms, say 10, 20 or 30; s, slide pointer; c, connecting bar between the two slide wires of no practical resistance. Dotted lines are bottom connections.

slide wire divided, as shown in the accompanying diagram, Fig. 1, which is partly explanatory, except to dimensions.

1. Can I scale the slide wires, as though it were not divided? That is, continuing the scale from one to the other?
2. Will the bar *c* cause any bother?
3. In "Experimental Electricity" only one resistance coil is given. Can I add two or three more without spoiling the operation? Or will I have to use only one coil at a time?
4. What would be the proper size of wire for the slide wire?
5. What changes would be beneficial, if any?—O. C. B., Iowa.

Questions 1 and 2. Yes, you can divide your slide wire, if you wish to, continuing the scale from one part to the other, provided that the connecting bar *c* has no resistance comparable with one equal length of the slide wire. It should be borne in mind, however, that it is impossible to insert any conductor which actually has zero resistance, and that this division of the slide wire, therefore, introduces a small error, which can be made as small as desirable by proper selection of the connecting bar. All connections between this bar and the slide wire should be carefully soldered to avoid the introduction of resistance at this point.

The necessity of taking these precautions may be seen by considering that the measurement of resistance with the instrument depends upon having the resistance of the wire uniform throughout its length.

Question 3. You may insert as many resistance coils as you please, and use one or all, or any number of them at one time, if you find it convenient to do so. In calculating the unknown resistance from a setting of the bridge, you will use the sum of all the resistances used in this branch. The resistance of the separate coils are usually multiples of 10—1, 10, 100, etc.—in order to facilitate computation, but it is not necessary that they should be.

Question 5. The form you suggest of dividing the slide wire is unusual, and, as has been suggested, introduces a small error. If you must have it short, you might simply use one-half or any other part of the original length you see fit. This will introduce no error; it will merely reduce somewhat the sensitiveness of the instrument. To do this will eliminate the error of the connecting block.

Can any harm result to the telephone by using a 110-volt light current for ringing telephone bells, when the regular power is off? A resistance is bridged across the circuit and a tap of 50 volts is used.—O. E. B.

The regular 110-volt circuit will suffice, with simply a 110-volt protective lamp in series. This will limit the current flow to one-half ampere. The method you suggest is all right, but I have used 110 ringing current regularly with no harm to any instrument or line.

We have two magneto trunk lines, No. 14 copper, transposed every 150 feet, running parallel with the 3,300-volt single-phase circuit of the experimental railway alternating trolley system. The wires are twenty feet from the trolley line. When the current is turned on, the induction is very loud. When the car is running, it is so loud that it can be heard across the room from the telephone, and it is impossible to talk. The lines are free from grounds, but when the current is on the trolley, to touch either side of the trolley wire means a distinct shock. I have installed repeaters at both ends, which helps some, although very little.—E. B. S., Pittsburg.

Right here is a cerification of what I have talked about in the first question, and to what I have been worrying about for some time. Here is a trolley line, with 3,300 volts, and a good, metallic, well transposed and balanced line running parallel nearly twenty feet away. Not only is the line noisy, but it shocks the parties using it. I wish that I had looked at this question before No. 1, but as I have no time to change the order of things, I will make the last question a part of the first. It is obvious that this well transposed line has weak insulation spots, where the static strain due to the 3,300-volt trolley causes the telephone line insulation to be broken down. And it is plain that this static strain is a real, tangible thing. It finds the weak spots on the line and goes to ground through them. As it goes to ground unequally, the current induced on the wire of the good side has to pass through the bridged receivers to get to the weak and bad side of the line. The chances are that that Pittsburg line is well built, and up to specifications. Yet it falls down when exposed to such a strain. To reduce this strain, I would suggest that the line sides of the repeating coils be connected to ground, through the middle points of the coil. Be sure that the coils are balanced. A method of this kind will allow the charges to flow to ground, before they can rise high enough in pressure value to act on the weaker insulators. By grounding the middle points of the coil, the lines will be safe from shock, and safe from the puncturing possibility of a static strain of 3,300 volts. Let the charges leak off at the harmless points. We used to bridge our toll lines with impedances, and then tap the middle points to ground, to get rid of static charges, when wind blew, or when chaff from the threshers blew across our lines. In this case, the grounding of the middle points will put your trunk lines at earth potential, and no charges can exist. I can only add the hope that we will hear a report of the effect of this remedy. Ground the middle points and let us know the results. This question is a great one, and I am willing to bet big money that telephone people will think a great deal before this alternating trolley condition gets settled. If you discover anything, let us know.

REPORTS SHOW GROWTH AND PROSPERITY.

The stockholders of the Fayette Home Telephone Company recently held their annual meeting in Lexington, Kentucky, 1,790 shares out of the 2,851 shares of the company outstanding being present. The president of the company made an itemized statement of the finances for each quarter, and also for the entire year ending December 31, 1904. These reports showed that the net income for last year was $59,599.73, as against $55,766.80 for the year preceding. The reports also showed that after charging off operating expenses and salaries there was a net earning for last year of $29,211.31, which sum was divided as follows: Interest on bonds, $14,300; charged off for reconstruction and maintenance, $11,430.17; leaving a net surplus of $3,381.14.

The reports also showed the income from the net tolls during the first quarter of 1903, $1,116.58; net tolls for the first quarter of 1904, $1,404.78; and the net tolls for the fourth quarter in 1904, $2,451.39. Increase from last quarter of 1903 to first quarter of 1904, about thirty-five per cent in one year; and an increase from first quarter, January, February and March, of 1904, to fourth quarter, October, November and December, 1904, of about sixty-five per cent in nine months.

The report on the number of telephones in the three exchanges, Lexington, Versailles and Midway, on February 1, 1905, showed that in spite of the increase in rates at the Lexington exchange during the past year, there had been no falling off in the number of telephones in the exchanges. The estimated income for the coming year amounts to $66,964.79. This estimate is based on the number of telephones in use on February 1, 1905, at the contract prices for those telephones, with no estimate for increase in number of telephones, or increase in tolls, while the estimated expenditures for the current year show a decrease over $2,000 in salaries and wages, and a further decrease of about $2,000 in material for maintenance and the renewal of plant.

The president also reported that the plant was in better condition than at any time in its existence, and was being maintained with fewer men than ever before; that great economy was being used in conducting the plant, but the policy of the company was to spend all the money that was necessary to keep the plant to the highest state of efficiency, and to prevent any deterioration. That the company has lived up to this policy is shown by the fact that nearly $11,500 was charged off for this purpose last year.

The only business transacted was the election of a board of directors for the current year. There was no change in the old board of directors, except that J. Rogers Barr was elected to succeed Col. W. C. P. Breckinridge, who had been a member of the board of directors from the organization of this company. The directors elected were: John R. Allen, J. Rogers Barr, Dr. David Barrow, George A. Bain, Desha Breckinridge, Joseph S. Botts, A. Smith Bowman, J. S. Brailey, F. A. Bullock, L. G. Cox, W. K. Massie, Geo. K. Graves, Richard Godson, Charles Kerr, J. D. Purcell, C. C. Patterson, John C. Rout, Jouett Shouse, J. W. Stoll, J. T. Shelby and George Shanklin.

Immediately after the adjournment of the stockholders a meeting of the new board of directors was held, at which the following officers were elected for the ensuing year: George S. Shanklin, president; A. Smith Bowman, vice-president; Charles Kerr, secretary; J. W. Stoll, treasurer.

In the Financial Field

FEDERAL TELEPHONE COMPANY EARNINGS.

Following are the earnings of the subsidiary companies of the Federal Telephone Company for January, as compared with January, 1904, with the exception of the United States Company. The earnings of the latter company for December are given, as the January earnings are not yet completed:

COLUMBIANA COUNTY TELEPHONE COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 4,033.85	$ 3,719.99
Expenses and taxes	2,761.18	2,910.82
Net earnings	$ 1,272.67	$ 809.17
Deductions	912.93	895.81
Surplus	$ 359.74	$ *86.64

*Deficit.

CUYAHOGA TELEPHONE COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$42,588.96	$32,873.44
Expenses and taxes	24,420.19	17,371.50
Net earnings	$18,168.77	$15,501.94
Deductions	11,861.64	10,353.72
Surplus	$ 6,307.13	$ 5,148.22

FINDLAY HOME TELEPHONE COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 1,819.85	$ 1,769.73
Expenses and taxes	1,182.26	1,150.16
Net earnings	$ 637.59	$ 619.57
Deductions	492.25	445.83
Surplus	$ 145.34	$ 173.74

CITIZENS' TELEPHONE AND MESSAGE COMPANY, FOSTORIA.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 1,103.90	$ 1,099.37
Expenses and taxes	673.72	656.61
Net earnings	$ 430.18	$ 442.76
Deductions	273.54	267.82
Surplus	$ 156.64	$ 174.94

LANCASTER TELEPHONE COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 1,534.23	$ 1,386.59
Expenses and taxes	808.56	702.02
Net earnings	$ 725.67	$ 684.57
Deductions	216.33	222.33
Surplus	$ 509.34	$ 462.24

MASSILLON TELEPHONE COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 1,695.23	$ 1,763.15
Expenses and taxes	1,205.06	1,223.31
Net earnings	$ 490.17	$ 539.84
Deductions	363.65	368.49
Surplus	$ 126.52	$ 171.35

STARK COUNTY TELEPHONE COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 6,188.79	$ 5,535.59
Expenses and taxes	3,108.15	3,060.07
Net earnings	$ 3,080.64	$ 2,475.52
Deductions	1,628.96	1,618.29
Surplus	$ 1,451.68	$ 857.23

YOUNGSTOWN TELEPHONE COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 4,365.03	$ 4,148.56
Expenses and taxes	2,063.16	2,160.11
Net earnings	$ 2,301.87	$ 1,988.45
Deductions	1,081.78	1,182.02
Surplus	$ 1,220.09	$ 806.43

ZANESVILLE TELEPHONE AND TELEGRAPH COMPANY.

	Jan. 1905.	Jan. 1904.
Gross earnings	$ 2,578.54	$ 2,437.52
Expenses and taxes	1,426.14	1,598.00
Net earnings	$ 1,152.40	$ 839.52
Deductions	618.00	681.10
Surplus	$ 534.40	$ 158.42

UNITED STATES TELEPHONE COMPANY.

	Dec. 1904.	Dec. 1903.
Gross earnings	$37,478.20	$32,772.26
Expenses and taxes	24,682.25	21,523.60
Net earnings	$12,795.95	$11,248.66
Deductions	9,285.67	8,728.64
Surplus	$ 3,510.28	$ 2,520.02

UNITED STATES TELEPHONE COMPANY.

The annual report and balance sheet of the United States Telephone Company for the year ended with December 31 shows a slight increase over last year. The report is as follows:

Year ended December 31:

	1904.	1903.	1902.
Gross earnings	$418,308	$379,234	$406,069
Net earnings	152,168	139,957	123,081
Other income	539	319	29
Surplus after charges	40,154	37,110	23,235

The general balance sheet as of Dec. 31, 1904, compares as follows:

Assets—	1904.	1903.	1902.
Property and plant	$4,305,909	$4,054,887	$3,925,016
Leased circuits	10,204	.....	.....
Material and supplies	19,977	30,562	53,073
Treasury stock and bonds	507,600	495,000	.....
Current assets	106,135	99,927	86,202
Deferred assets	3,008	4,582	1,134
Total	$4,952,834	$4,689,048	$4,065,425
Liabilities—			
Common stock	$2,000,000	$2,000,000	$2,000,000
Preferred stock	500,000	500,000	.....
Mortgage bonds	2,085,000	1,970,000	1,865,000
Current liabilities	298,925	187,817	215,201
Deferred liabilities	12,783	11,259	6,363
Surplus	56,126	15,672	21,138
Total	$4,952,834	$4,685,048	$4,065,425

EVERETT-MOORE SYNDICATE RELEASED.

The Everett-Moore syndicate was practically released from the trustees who have controlled their various securities during the past three years, at a meeting of the trustees held recently in Cleveland, Electric building, Friday morning. Col. F. S. Dickson announced that settlements had been made with all the creditors with the exception of one and the failure to settle with this creditor was due to a dispute as to who held the claim against the telephone company. The trustees, however, decided that it was not necessary to delay the matter further and passed a resolution making Col. Dickson agent of the trustees and giving him full authority to release the syndicate members and turn over their securities to him just as soon as the matter referred to

is settled. Col. Dickson will undoubtedly do this within a very short time.

WILL VOTE ON BIG BOND ISSUE.

Notice has been given that there will be a special called meeting of the Interstate Telephone Company, at its office in St. Joseph, Missouri, on Tuesday, April 4, for the purpose of voting upon a proposition to increase the capital stock of said company from $200,000 to $1,000,000, also to vote on a proposition to be submitted at that time, to bond the property of the Interstate Telephone Company for the sum of $750,000. Said bonds to be secured by a first mortgage on all the present property of the company, together with all the improvements and additions that may be hereafter added to same. Said bonds to be used for improvement of its present property and purchase of additional properties. The bonds to bear interest at the rate of 6 per cent per annum, paid semi-annually.

OFFERS $50,000 FIRST MORTGAGE BONDS.

There is being offered $50,000 of the first mortgage 5 per cent thirty-year sinking fund gold bonds of $1,000 each, of the Home Telephone and Telegraph Company of Santa Monica and Ocean Park, California, at 95, each bond carrying a bonus of $1,000 stock. The authorized issue of bonds will be $150,000 to provide for the installation of 500 automatic telephones with extension possibilities in excess of 1,000 subscribers. The Title Insurance & Trust Company of Los Angeles is trustee under the mortgage. The bonds are dated February 1, 1905, and are due thirty years thence, subject to call at the company's option at 105 on or after February 1, 1915. Interest is payable August 1 and February 1, at Santa Monica, Los Angeles and New York.

FEDERAL WILL PAY DIVIDENDS.

The Cleveland Plain Dealer says: "Among the various telephone companies controlled by the Federal Telephone Company the plan has been adopted for paying dividends on the stocks of the best revenue earners. The preferred stock of the Youngstown Telephone Company has been placed on a 6 per cent basis and the first 3 per cent semi-annual payment was made to the stockholders during the present week. The common stock will draw 4 per cent and the first 1 per cent quarterly dividend has been paid. The Lancaster Telephone Company has put its stock on a 4 per cent basis and the first payment has been made. It is quite probable the same step will be taken with other companies where good earnings are shown."

TRUST MORTGAGE FOR $70,000.

A trust mortgage for $70,000, given by the Consolidated Telephone Company of Milwaukee to the Milwaukee Trust Company has been filed. The bonds run for twenty years and bear 5 per cent interest. There are 400 bonds in the amount of $100 and sixty of the value of $500. The trust deed covers all the property of the company located in Richland, Grant, Iowa, Crawford, Vernon, Sauk, Lafayette and Jefferson counties, Wisconsin, and is subject to a mortgage of $40,000 executed June 1, 1904, by the Union Telephone Company. The bonds are signed by A. L. Hutchinson, president, and M. N. Low, secretary of the Independent company.

BRIEF FINANCIAL NOTES.

Kansas City Home Telephone Company bonds are selling around 96½.

Bonds of the South Bend (Ind.) Home Telephone Company are selling at par.

The Bend (Ore.) Telephone Company has increased its capital stock to $25,000.

The Pope County Telephone Company of Golconda, Illinois, has increased its capital stock from $5,000 to $15,000.

The Kenesaw (Neb.) Telephone Company has declared a dividend of 10 per cent.

The Benzie County (Mich.) Telephone Company has declared a dividend of 8 per cent.

The Salamonia (Ind.) Telephone Company has increased its capital stock from $2,500 to $10,000.

The Laporte (Ind.) Telephone Company has increased its capital stock from $30,000 to $60,000.

The Richwood (Ohio) Telephone Company has increased its capital stock from $20,000 to $50,000.

The Morenci (Mich.) Telephone Company has increased its capital stock from $10,000 to $20,000.

The Dayton (Iowa) Telephone Company has filed an amendment increasing its capital stock to $25,000.

The Washtenaw (Mich.) Home Telephone Company has increased its capital stock from $250,000 to $300,000.

The Wilkes Telephone and Electric Company of Washington, Georgia, has declared a 43 per cent dividend.

The Stamper Union Telephone Company of Benton, Illinois, has declared a semi-annual dividend of 4 per cent.

The Citizens' Telephone Company of Delaware, Ohio, has increased its capital stock from $100,000 to $125,000.

The Farr Telephone and Construction Company of Chicago has increased its capital stock from $10,000 to $25,000.

The Western Wisconsin Telephone Company of Arcadia, Wisconsin, has increased its capital stock from $50,000 to $60,000.

The Mississippi Valley Telephone Company of Carthage, Illinois, has increased its capital stock from $25,000 to $50,000.

The Pana & Christian County Telephone Company of Pana, Illinois, has increased its capital stock from $15,000 to $30,000.

The Catskill Mountain Telephone Company of Cairo, New York, has voted to increase its capital stock from $15,000 to $30,000.

The Farmington Valley Telephone Company of New Britain, Connecticut, has just declared its eighth semi-annual dividend of 3 per cent.

The Kansas City Long-Distance Telephone Company has issued bonds to the amount of $1,500,000, taking up old bonds, and to build new lines.

The directors of the Tri-State Telephone Company of Minneapolis have declared the seventh quarterly dividend at the rate of 6 per cent per annum.

The directors of the Twin City Telephone Company of Minneapolis have declared the twelfth quarterly dividend at the rate of 7 per cent per annum.

The Burlington, Rochester and Kansasville (Wis.) Telephone Company, which has been in operation one year, has declared a dividend of 5 per cent.

The Plattsmouth (Neb.) Telephone Company reports an increase of more than 50 per cent in business the past year, and has declared a 12 per cent dividend.

The Bellechasse Telephone Company of Quebec, Canada, has applied to the Canadian Parliament for authority to increase its capital stock from $100,000 to $1,000,000.

The annual report of the Fayette Home Telephone Company of Lexington, Ky., shows net income for the past year to have been $59,599.73, and net earnings $29,211.31.

The Columbia Telephone Company of Hudson, New York, has declared its second quarterly dividend of 1 per

cent. The company has been in operation only a short time.

The Liberty Center (Ind.) Telephone Company has increased the capital stock from $2,500 to $25,000.

The Barlow and Watertown (Ohio) Telephone Company has increased its capital stock from $10,000 to $15,000.

At a recent meeting of the Newark (N. J.) Independent Telephone Company it was decided to increase the capital stock to $150,000.

The Stonypoint (Ind.) Home Telephone Company has increased its capital stock from $10,000 to $30,000 for the purpose of making extensive improvements.

The Bowling Green (Ky.) Home Telephone Company is prospering finely, having done $2,152.54 more business in 1904 than in 1903, beside paying a dividend.

The Long Island (N. Y.) Central Telephone and Telegraph Company has filed a certificate with the secretary of state increasing its capital stock from $5,000 to $100,000.

The stockholders of the Johnstown (Pa.) Telephone Company have increased the capital stock from $200,000 to $440,000 for the purpose of making extensive improvements.

The Central Trust Company of Baltimore, Maryland, has paid the semi-annual interest on the Maryland Telephone 5 per cent first mortgage bonds, amounting to about $25,000.

The directors of the United Telephone Company of Monroe, Wisconsin, have declared a dividend of 4 per cent for the past six months, which is two-thirds of the net earnings.

The old stock of the New Citizens' Telephone Company of Batavia, Ohio, has been retired. In its place will be issued $75,000 of 6 per cent preferred, and the same amount in common.

The Ontario & Steuben Telephone Company of Naples, New York, instead of declaring the usual 12 per cent annual dividend will take the money and apply it toward enlarging its plant.

The directors of the Lima (Ohio) Telephone and Telegraph Company have voted to issue $10,000 additional preferred stock to bear 5 per cent interest, which will be placed on the market at once.

At the semi-annual meeting of the Georgia Telephone & Telegraph Company at Savannah, Georgia, a dividend of $2.50 per share was declared. Reports showed the business to be in excellent condition.

The Home Telephone Company of Wabash, Indiana, has increased its capital stock from $20,000 to $50,000, to provide for additional equipment and extension, to take care of its rapidly increasing business.

The Hamilton (Ohio) Home Telephone Company has increased its capital stock from $200,000 to $300,000. The proceeds of the sale will be used for the extension of the company's service. The stock will be 6 per cent preferred.

The Missouri & Kansas Telephone & Telegraph Company, a Bell subsidiary, for the year ending December 31, 1904, showed a deficit of over $47,000. The deficit is attributed to the activity of the Independents in the two states.

A committee of bankers and brokers interested in the Cuyahoga Telephone Company has been appointed to raise money for a loan of $850,000 to pay off the floating indebtedness of the company and increase the capacity of the plant to 22,000.

The Toledo Courier says: "Yesterday $100,000 of Springfield & Xenia telephone bonds changed hands at a fraction over 70. This is one of the biggest deals of the kind handled in Toledo in some time, and it is significant, as these same bonds sold within the past six months at about 62. The stock of the company, which is quoted here at 15, is said to be worth 25, but there is none of it on the market at any price."

The People's Telephone Company of Superior, Wisconsin, has been authorized to issue $100,000 bonds, and proposes to erect a fireproof exchange building and install a selective ringing apparatus. There is to be considerable new cable work and conduit extensions.

The preferred stock of the Youngstown (Ohio) Telephone Company has been placed on a 6 per cent basis and the first 3 per cent semi-annual payment has been made. The common stock will draw 4 per cent and the first 1 per cent quarterly dividend has been paid.

The Western Telephone Company of Lincoln, Nebraska, has filed an amendment of its articles of incorporation by which its $1,000,000 capital is divided into classes of stock. Five thousand shares will be known as cumulative 6 per cent preferred stock, and the balance will be common stock.

At the annual meeting of the Stark County Telephone Company, recently held at Canton, Ohio, the common stock in the treasury, amounting to $190,000, was converted into 6 per cent preferred, which will be sold to take care of further development, instead of increasing the present bond issue of $325,000 outstanding.

According to the terms of its franchise the Indianapolis Telephone Company has paid into the city $3,533, which covers its semi-annual assessment. By the provisions of the franchise it pays the city $6,000 a year for 6,000 telephones and $2 for any in excess of that number. The $533 pays for 1,066 additional telephones.

The Wabash (Ind.) Home Telephone Company has increased its capital stock from $20,000 to $50,000 and put in a $10,000 switchboard. The company has about $70,000 invested in its plant, its stock and bonds are all owned in Wabash, and it is paying in addition to the interest on its $25,000 bond issue, 6 per cent on its stock.

An entirely new system of telephone service and a new scale of prices, meaning the expenditure of the proceeds of an $800,000 bond issue, will be installed by the Syracuse (N. Y.) Telephone Company in the near future, if present plans are carried out, according to statements made lately by Ernest I. White, one of the directors and attorney for the company.

The Eastern Illinois Independent Telephone Company of Kankakee, Illinois, recently declared a dividend of 2½ per cent on the first six months of business. This, the management declares, is a fine showing when it is considered that at the beginning of the first six months comparatively few of the telephones were in service and the receipts correspondingly reduced. The prospects for the coming six months are highly flattering.

The Cleveland Press states that "Strength was generally apparent throughout the list on the Stock Exchange Monday. Trading in bonds was particularly active, and United States Telephone 5s headed the list with a record of 10 lots aggregating $35,000, at prices ranging from 80½ to 81. The strength of these bonds is ascribed to the development and growth of the company's business, and the favorable showing made in its recent reports."

HEARS FUNERAL BY TELEPHONE.

Lying in the General hospital at Allegheny, Pennsylvania, with two compound fractures of his left leg, Benjamin P. Welsch, an Allegheny druggist, listened to the funeral services over his wife's remains, which were held at her late residence, a telephone connecting his bed with the house. With his mouth to the telephone the Rev. Thomas Park preached the funeral sermon, the husband in the hospital, with the receiver at his ear, hearing every word spoken by the minister.

Best Method of Telephone Advertising

W. B. WOODBURY.

W. B. WOODBURY.

This is a broad topic. There is material enough in it for the most careful and lengthy discussion. Advertising in our business, it seems to me, is anything which brings the company to the favorable notice of the public. You can gain this favorable notice in several different ways:

By the impression that your solicitors make upon the people with whom they come in contact.

By the character of the service you furnish your patrons and the public generally.

By the courtesy and tact of your office people, and especially the switch girl in the operating room.

By all those who are thrown directly in contact with the public, whether it be manager, switch girl, trouble man, collector, adjuster or contract agent.

By means of newspapers and other publications, theater programmes and the like.

By placing the proper signs advertising the location of your pay-stations, etc.

By means of cards in streetcars.

By the use of circulars and other "follow-up" matter sent out on your regular mailing list or with your quarterly or monthly statements.

For my part I believe the solocitor, if he is of good address, energetic, resourceful and tactful, together with good service and the reputation of the company for fair dealing with the public, is about the best means of advertising the business a company can have. Good service gives a solicitor the basis for his argument and the reputation of the company for fair treatment inspires confidence in the person with whom he is negotiating.

As to the requirements of the solicitor, he must possess tact and courtesy, and should be neat and clean, not necessarily a fop, but a shave and a shine go a long way in dealing with some people. He should know his business and how to tell it, and he should have a fair knowledge of the practical end of telephony so that he will not take contracts your construction men cannot handle. He should be able to hold his temper under all circumstances, and he should know when it is well to importune a man and when it is well to leave him alone. He should be industrious. The solicitor is an instrument for either good or evil. Telephone managers should be careful as to the character of these most important adjuncts of the business. It pays to get good men, even if they do come high.

The service you give in your exchange is worth all the newspapers and other advertising mediums you can mention if the other fellow's service is bad or only middling good. The proper kind of service brings patrons to your office without advertising or soliciting. The service you give will also take them off your list just as readily if it is not good. If the subscriber complains about the service show him where the trouble lies and convince him that you are doing everything to right his particular wrong.

*Note.—Abstract of paper read before meeting of District No. 1 of the Ohio Independent Telephone Association at Cleveland, Ohio. Mr. Woodbury is assistant general manager of the Cuyahoga Telephone Company of Cleveland.

Have the right kind of people at the office end of your telephone taking complaints; a tactful person in good voice will be able to give the "soft answer that turneth away wrath." A complaint that is not properly treated is a decidedly bad advertisement.

Then, too, the man at the telephone in the contract office is worth several solicitors if he is the right kind of a man. If he understands his business he can save hundreds of dollars in advertising and increase the company's revenue correspondingly. If he is not the right kind of a man he is also a bad advertisement and of the kind that costs the company money and prestige.

The newspaper, be it daily or weekly, if it has character, circulation and influence, is a decidedly good medium for promoting the telephone business, but it does not by any means cover the entire field. It is an adjunct of decided importance, but not absolutely indispensable.

When it is decided to advertise in the newspapers, outline the campaign carefully, get all the matter well in hand, and then operate along consistent lines, varying it occasionally by the introduction of some timely matter, such as announcing the time of closing the telephone book or its delivery, or some other special announcement which you think it is opportune to make at some particular time.

The advertisements should be prepared with considerable thought and should be made attractive, couching them in language easy to understand. Special attention should be given to the choice of words and the selection of good, clear type, and then it is well to have electrotypes made so as to insure the use of the proper type and make-up, and to keep the printer well within the space you think you can afford.

In newspaper advertising position is everything. Be sure to get your copy placed next to reading matter, surrounded by reading matter, if possible, and away from all other advertisements. It is not good policy to advertise the other fellow too much or belittle him, although a little fun at his expense now and then makes a hit and does not detract from the effect of your own advertisement. In newspaper advertising it is advisable that the campaign be opened vigorously so as to get the people to reading your compositions, and then you can cut down on space, because if your advertisements are attractive and interesting the people will continue to look for them and find them even if you only use a quarter of the space with which you started. Make the advertisements suit the character of the people the paper reaches insofar as possible.

Programmes and other one time publications are little to be desired, as advertising to win results must be persistently followed up.

Here in Cleveland we think streetcar cards are about as helpful as any medium we use. We started with a small number of cards and now use all the cars in service. From the standpoint of getting results for streetcar advertisers, this city is ahead of almost any city in the country, owing to the excellent business management of the advertising agency controlling the cars. They have succeeded in stimulating the highest efforts of the advertising art. Streetcar cards should be attractive from the point of reading matter, brief and catchy, and still of sufficient character to get favorable notice. They should be printed well, in fact too much attention cannot be given to the typography. These cards should be changed at least twice a month—in some instances oftener.

Circulars and other forms of "follow-up" advertising

some time bring results to telephone companies, and this medium is used extensively in the east by the opposition companies. These circulars and booklets, however, unless decidedly clever and interesting to the person receiving them, generally find their way into a convenient waste-basket. This kind of advertising should be followed up consistently upon a mailing list revised to the minute, and supplemented by the calls of the solicitor.

Pay-station receipts can be materially increased if suitable metal signs are provided for the outside of the building in which the telephone is located, and the station within properly designated. Transparencies in the windows of hotels and drug stores at night are another good means of letting the people know where to find the telephone. The metal sign for the outside should have for its main feature the shield emblematic of anti-Bell, and should be of the best material and design to successfully withstand the elements. Great care should be exercised in the placing of these signs so they may be readily seen by the people on the street.

When the quarterly bills are sent out to subscribers there is an excellent opportunity, without any additional expense for postage, of sending out timely announcements and notices concerning the company's business, with more than a fair prospect of their receiving attention.

The points touched upon in the foregoing are not given with any idea that they cover the field of advertising in relation to telephones, but simply to have something upon which to base a discussion as to the best method.

SIOUX CITY CASE IS SETTLED.

The controversy in which the Sioux City (Iowa) Telephone Company, Bills Brothers and the General Engineering Company have been mixed has been settled, and announcement is made that within ninety days the people of Sioux City will be talking over the new automatic telephones. Negotiations for a settlement which had been pending for some days were closed several days ago at a conference at which George C. Scott represented the Sioux City Telephone Company and Bills Brothers, and A. F. Call represented the General Engineering Company and the receiver of the telephone company, E. W. Hammer.

On March 10 the work of installing the telephone plant was resumed. Most of the work, outside the putting of telephones in stores and residences, has been done. Cables are yet to be strung, and poles are to be erected in Leeds and Morning Side.

When the Sioux City Telephone Company decided to install a new telephone system in Sioux City it let to Bills Brothers the construction contract. Bills Brothers sublet a large part of the work to the General Engineering Company. On February 4 the General Engineering Company claimed that Bills Brothers owed the company $51,000 for work and material. Bills Brother disputed the claim, putting on the contract an interpretation which differed radically from the interpretation of the General Engineering Company. The Engineering company declared Bills Brothers should pay for the material as it was ordered; Bills Brothers that they should pay for the material only as fast as it was delivered into the construction work.

The General Engineering Company filed a mechanics' lien for $51,000 against the plant and then brought suit to foreclose the lien and asked for the appointment of a receiver. E. W. Hammer, an officer of the General Engineering Company, was made receiver. Later the order of the court was modified so as to confine the receivership to work done by the General Engineering Company.

Bills Brothers have been engaged in checking up their business with the General Engineering Company and invoicing materials that have gone into the plant, so as to be fortified in making a settlement. As a result of the settlement which has been agreed upon, the litigation in Sioux City and an action which was brought in Lincoln, Nebraska, on the same claim, have been dropped, and the suits dismissed. The General Engineering Company is to transfer to Bills Brothers all material in its warehouse and yards in Sioux City.

KINLOCH TELEPHONE COMPANY'S NEW BUILDING.

What is claimed will be, when completed, one of the largest and most complete exchanges in the world is being erected by the Kinloch Telephone Company at the northwest corner of Tenth and Locust streets, St. Louis. The building will be 102 feet on Tenth street by 120 feet on Locust street, and six stories in height. The style adopted for the design of the building is of the modern Renaissance, and the first story is to be of gray granite, with white Bedford stone, above which will be red pressed brick, with white joints and white terra cotta trimmings for the remaining stories. The interior will be constructed with steel columns and floor beams, incased and filled in between with re-enforced concrete. The first and second stories and a portion of the basement are to be used for wholesale purposes, and the remaining portion of the basement, together with the third, fourth, fifth and sixth stories, by the telephone company, the operating room occupying the entire sixth floor.

Throughout the entire arrangement and construction of the building no pains or expense will be spared to make a thorough, complete and convenient exchange, excelled by none in the country. Special attention has been given to the heating and ventilation; the operating room is so arranged as to receive at all times a supply of fresh air, warm in winter and cooled in summer, and the vitiated air to be drawn off and discharged outside of the building. Entrance for use of the company's employes is from the Tenth street side, with elevators exclusively for the use of the operating department. Freight elevators are also provided on the alley side, while elevators for the use of the wholesale business, occupying the basement, first and second floor, are arranged separately. The entire building will be ready for occupancy the latter part of the year, plans having been completed and contract let by the architects, Widmann, Walsh and Boisselier.

There is no other business that better indicates the development of St. Louis than the growth of the Kinloch company, which is a home institution, owned, controlled and operated entirely by St. Louis citizens. Just six years ago the Kinloch began operations with 4,000 subscribers, and now has 15,000 telephones in service. When the new exchange is completed the Kinloch will then furnish the most convenient and satisfactory service that it is possible to render. Recently toll connections have been completed by the Kinloch system throughout Missouri, Kansas, Illinois, Kentucky, Ohio, Pennsylvania, West Virginia, and nearly all the cities and towns throughout the central states, and in addition through service to such cities as Kansas City, Indianapolis, Louisville, Columbus, Cleveland, Pittsburg and Baltimore, and intermediate points, reaching, it is claimed, more than 350,000 Independent telephones.

Thirty-seven girls employed by the Bell telephone company at Cleveland have formed a Bible class for the study of the Scriptures an hour every Saturday evening. The class assembles in the main room of the exchange and listens to explanations of the gospel by a teacher from a prominent downtown church. The girls from the several branch exchanges join their sisters of the main exchange during the hour of study.

Annual Report of Cuyahoga Telephone Co.

AT the annual meeting of the stockholders of the Cuyahoga Telephone Company of Cleveland, Ohio, held on February 6, Frederick S. Dickson, president of the company, presented a detached report for the year 1904, which showed the Cuyahoga to be in a highly prosperous condition, and with every prospect of the coming year being the most successful in every way in its history. The report was particularly gratifying to the stockholders, evincing to them that there is nothing lacking in the management of the company, and it is herewith presented in full:

To the Stockholders of the Cuyahoga Telephone Company:

We have the honor to submit to you our report for the year 1904.

NEW EQUIPMENT.

Our new switchboard was installed on March 5, 1904. For a month thereafter we were fully occupied in adjusting our telephones to the new situation, and were not able to begin our campaign for new business until April.

INCREASED EARNING CAPACITY.

On February 29, 1904, we had in all 10,260 telephones and our monthly net increase in telephones was as follows:

	Telephones.
March	37
April	428
May	445
June	622
July	371
August	310
September	381
October	411
November	446
December	659
Making a total net gain in ten months of...	4,110
And a total in service on December 31, 1904.	14,370

You will notice that the largest increase for the year was during the last month, December, indicating that we are yet far from reaching the limit of our development. During January, 1905, our good record has been maintained and the net increase in telephones was 651, giving us 15,021 telephones in service on January 31, 1905. The gross increase in annual rentals for the work of 1904 amounts to $106,401.50, while the increase for January, 1905, adds thereto the sum of $13,936.75. With our new equipment we are able to give to our patrons a quality of service that seems to be eminently satisfactory.

LOSS IN TELEPHONES.

In all classes of business there is a natural loss incident to death, failure, removals and the like, of customers. A man may remove from Cleveland to a nearby town and still continue as a customer to his dry goods merchant or grocer, but he must of necessity change his telephone. The number of such changes is, therefore, large and new business must be secured to make up for this loss. The total number of telephones installed during 1904 was 6,140 and the total number canceled was 2,036. This amounts to a loss of 169 2-3 telephones a month, or about 16½ per cent annually on the average number of telephones in service.

COMPARATIVE INCREASE IN BUSINESS.

The Bell Telephone Company does not publish its figures and, therefore, the only comparison that can be made between it and The Cuyahoga Telephone Company relative to an increase in business must be based upon the telephone books of the two companies. By careful count we find the following number of names in the Bell books published during the past year:

January, 1904	14,442,		
July, 1904	14,688,	increase, 246	for 6 months
October, 1904	14,915,	increase, 227	for 3 months
January, 1905	15,040,	increase, 125	for 3 months
Making a total increase of		598	for 12 months

An average of less than 50 a month.

The Cuyahoga Telephone Book shows the following names:

March, 1904	8,300,		
June, 1904	9,164,	increase, 864	for 3 months
September, 1904	10,753,	increase, 1589	for 3 months
December, 1904	12,194,	increase, 1441	for 3 months
Making a total increase of		3894	for 9 months

An average of 432 a month.

If these averages are maintained in the future, the July book for 1905 will give The Cuyahoga Telephone Company a total of 15,688 names, while the Bell book will have but 15,390. It is, however, our confident expectation that *before* the present year is half gone The Cuyahoga Telephone Company will lead the Bell in the number of its patrons, as it does now in the quality of its service. This anticipated increase is not, however, founded upon mere guess work, but upon known conditions and upon well-formed and carefully matured plans, and I am inclined to believe that the average increase of the Cuyahoga Telephone Company will exceed 500 a month instead of falling below, and we also believe that the Bell company will recede in numbers instead of increasing, for after all the question of service must rule, if rates are on a parity. It is quite impossible for the Bell company to give satisfactory party-line service, as one telephone bell cannot be rung without ringing the others on the same line. As far as rates are concerned, our present figures are in nearly all cases below the figures of the Bell company and for no class of service are our figures higher than theirs. Some reductions have lately been made in rates by the Bell company, but they have been confined to classes of business limited in extent. Thus the price for main line residence telephones for which they formerly received $60 a year has been reduced to $48, the same price which we are now getting for similar service. I am informed that when this reduction was made by the Bell company it applied to just 320 contracts and no more.

ADVERTISING.

Our campaign for new business will be conducted vigorously during the coming year. We secured the services of Mr. John E. Powers of New York and placed in his hands our advertising for the coming year. His work has been completed and we believe it will be effective in securing new business, entertaining to the public and interesting to our competitors.

COLLINWOOD.

During the past year we entered into negotiations with the owners of the Collinwood exchange and purchased the plant outright. The old mortgage on this property was canceled and it is now covered by the general mortgage of The

Cuyahoga Telephone Company. This was an important acquisition for us, as this suburb of Cleveland is growing rapidly and its business interests are becoming increasingly important. It will be necessary for us to spend about $49,400 upon this plant to provide for its proper development and to give to these people the same character of service that we give to all other parts of our system.

FINANCIAL REQUIREMENTS.

Our financial requirements are as follows:

For current liabilities for development made during past year...		$437,121.44
For future development—6,000 telephones	$240,000.00	
For additional cable	114,885.00	
For Collinwood plant	49,400.00	
Total future requirements...		404,285.00
Making a total of		$841,406.44

During January, 1905, $167,000 of additional bonds have been issued, of which $32,000 par value were used in acquiring the Collinwood plant, leaving now in the treasury a balance of $135,000 par value of bonds. We also have in our treasury $741,750 par value of the preferred stock of The Cuyahoga Telephone Company. The installation of 6,000 additional telephones would undoubtedly give us sufficient development to justify the issue of $533,000 more of bonds and enable us to provide for the large sums needed this year either by the sale of bonds or by the sale of our preferred stock. It seems to me wise to postpone if possible the actual settlement of this question until this development is made, and I expect to be able to borrow the necessary sums during the present year and avoid the actual sale of our preferred stock or bonds until the market for both forms of securities is vastly improved by the increased earning power which this development is certain to show. Personally, I would advise that we make an effort to pay for our future development by the sale of preferred stock rather than by an increase in our issue of bonds.

COLLECTIONS.

There seems to have been uniform trouble in all telephone companies in collecting their accounts, owing to bad policy controlling business in the past. In 1900 The Cuyahoga Telephone Company collected only 69.60 per cent of its rentals; in 1901, 77.91 per cent; 1902, 82.34 per cent; 1903, 87.02 per cent, and in 1904, 91.16 per cent. We expect to increase this percentage materially during the present year. We believe it is good policy to insist upon prompt payment of rentals and tolls and if the payment is not made when due it is better to remove the telephone forthwith rather than to permit it to remain in the possession of a subscriber who is either unwilling or unable to pay for the service. An increase in the number of telephones is a source of loss rather than of profit unless there be a compensating increase in the income.

RENEWAL OF CONTRACTS.

During the past year we have rewritten 2,256 contracts with our patrons at our new rates. Our policy has been to secure new subscribers as rapidly as possible and not to interfere with old contracts until the wires were actually needed by waiting customers. Where contracts had expired the user of a telephone was given an opportunity to renew his contract at our revised rates, to take party line service at lower rates, or to give up the telephone altogether, at his discretion. No attempt, of course, has been made, or will be made, to interfere with any contracts which have not yet expired by limitation, and the work of renewing our old contracts will be continued during the coming year in the same conservative spirit. It was formerly the policy of this company to write contracts for as long a term as possible, but it has seemed wise to us to restrict the term to one year, as experience has proved that the customer insisted upon abrogating his contract when it suited his convenience, only retaining it when to retain it was to his advantage.

STREET PAY-STATIONS.

During the first week in December we set up two public street pay-stations at the corner of Euclid avenue and Bolton avenue and at Euclid avenue and East Madison avenue. We propose to add six more of these pay-stations at points distant from any store or business house where telephoning may be done. We charge five cents for each call and give free service at all times for fire, police, or ambulance calls. These stations are not likely to be very profitable in themselves, but they are clearly in the line of efficient public service, and, therefore, within the limits of our settled policy. We are endeavoring also to secure permission from the city to place two pay-stations in the shelter houses in the city square. Other developments of this character will be made as fast as the public demand them.

MEASURED SERVICE.

The Bell Telephone Company has developed a measured service business by which the switchgirl has kept tally on calls on a bit of paper at the switchboard. Such a system, or rather want of system, seems to us highly objectionable, as errors are bound to creep in, the service is interfered with and delayed, and we, therefore, have refused to attempt to give measured service at all unless it could be done without these objectionable features. Still we believe in measured service as the fairest of all methods in telephoning, and we have installed a number of mechanical recorders supplied by the Measured Service Company, and while some mechanical defects have been shown in practice, this company has exhibited a proper enterprise by cheerfully altering the apparatus whenever necessary, and correcting the defects as fast as they were shown. We believe that during the coming year they will be able to furnish a thoroughly satisfactory meter whose record cannot be disputed, as it shows each call on a dial at the telephone and can also be read from the office at will.

PROFIT SHARING.

We have continued our profit-sharing plan during the past year and with gratifying results. The spirit which prevails generally among our employes is of the best and all seem imbued with a desire to aid in making the company prosperous and a credit to those charged with its management. We have believed it to be wise also to furnish free of cost at noon hot tea and coffee to our women employes. This service costs the company about $50 a month, but it seems to be highly appreciated by our employes. The reports of the heads of departments, as submitted to the general manager, indicate a feeling of proprietorship in the company that promises well for the future. Mr. French, our general manager, gathers his heads of departments about him daily and the condition of the company, its various needs and shortcomings, are discussed freely and fully. These meetings tend to unify the feelings and sentiments of our employes.

DIVIDENDS ON STOCK.

During the past year, as you willl notice from our report, we have earned dividends on our preferred stock and also a surplus in excess thereof amounting to $10,991.06. Since January 1, 1904, we have not paid these dividends, as we needed all available funds for development. As soon as we arrange permanently for financing our increase of plant we will be in a position to resume payment of these dividends regularly on all our preferred stock. The increase in earnings gives us reason to believe that we will earn during 1905 a substantial surplus available for dividends on the common stock, but it is not, however, likely that the directors will think it wise to pay dividends upon this class of

stock as long as our necessity for development claims all our available resurces.

I think our stockholders may well feel gratified at the results secured during the past year and can look forward with confidence to the future well-being of our property. Personaliy I have to thank our stockholders and our employes, the press and the public, for their kindly and generous support in the past. In return we will endeavor to give to our stockholders a fair return for their investment, to our employes an honest share in our prosperity, to the press "all the news that's fit to print," and to the public, the best there is in us. Very respectfully submitted,

FREDERICK S. DICKSON, President.

TREASURER'S REPORT.

The following is the annual report of Treasurer R. W. Judd of the Cuyahoga Telephone Company for 1904:

Comparative General Balance Sheet—December 31, 1904, and December 31, 1903:

ASSETS.

	Dec., 1904.	Dec., 1903.	Increase.
Property and plant	$4,862,633.52	$4,444,710.00	$417,923.52
Treasury stock—preferred	741,750.00	837,950.00	96,200.00*
Material and supplies	47,169.03	54,344.01	7,174.98*
Current assets	96,858.60	86,734.18	10,124.42
Deferred assets	5,273.32	4,645.76	627.56
Total assets	$5,753,684.47	$5,428.383.95	$325,300.52

LIABILITIES.

Capital stock—common	$1,500,000.00	$1,500,000.00	.....
Capital stock—preferred	1,500,000.00	1,500,000.00	.....
Mortgage bonds	2,233,000.00	2,233,000.00	.....
Current liabilities	437,121.44	171,338.14	$265,783.30
Deferred liabilities	10,474.81	6,844.72	3,630.09
Reserve for dividends on pfd. stock	45,495.00	1,800.00	43,695.00
Reserve accounts—sundries.	1,201.07	.....	1,201.07
Total liabilities	$5,727,292.32	$5,412,982.86	$314,309.46
Surplus	$ 26,392.15	$ 15,401.09	$ 10,991.06
Total	$5,753,684.47	$5,428,383.95	$325,300.52

Comparative Statement of Earnings and Expenses, and Income and Profit and Loss Accounts, for Years 1904 and 1903:

Earnings:	1904.	1903.	Increase.
Rentals—telephone	$350,422.96	$322,806.92	$27,616.04
Rentals—building	54,847.55	50,412.70	4,434.85
Tolls	28,819.38	20,149.98	8,669.40
Miscellaneous	1,184.13	3,120.60	1,936.47*
Gross earnings	$435.274.02	$396,490.20	$38,783.82
Expenses:			
Operating	$ 54,666.54	$ 49,402.33	$ 5,264.21
Maintenance	108,607.76	100,234.82	8,372.94
General	57,474.49	45,281.75	12,192.74
Total	$220,748.79	$194,918.90	$25,829.89
Percentage—expenses to earnings	50.71	49.17	1.54
Taxes	$ 18,992.58	$ 19,041.62	$ 49.04*
Expenses and taxes	$239,741.37	$213,960.52	$25,780.85
Net earnings	$195,532.65	$182,529.68	$13,002.97
Deductions:			
Interest on bonds	$111,650.00	$111,650.00	.....
Miscellaneous charges	7,013.63	4,790.88	$ 2,222.75
Ground rent	3,000.00	2,500.00	500.00
Reserve—bads debts, depreciation	6,735.89	9,517.95	2,782.06*
Fee Secretary of State	.....	1,500.00	1,500.00*
Total	$128,399.52	$129,958.83	$ 1,559.31*
Surplus for period	$ 67,133.13	$ 52,570.85	$14,562.28
Deductions:			
Reserve—dividends preferred stock	$ 43,955.25	$ 1,800.00	$42,155.25
Employes' share profits	12,022.17	4,154.69†	7,867.48
Items pertaining to previous year	164.65	2,072.35	1,907.70*
Total	$ 56,142.07	$ 8,027.04	$48,115.03
Balance	$ 10,991.06	$ 44,543.81	$33,552.75*
Surplus beginning period	$ 15,401.09	$ 29,142.72*	$44,543.81
Surplus close of period	$ 26,392.15	$ 15,401.09	$10,991.06

Comparative Statement of Cash Receipts and Disbursements for Years 1904 and 1903:

	1904.	1903.	Increase.
January 1, balance on hand	$ 5,729.45	$ 8,299.48	$ 2,570.03*
Receipts:			
Rentals—telephone	$340,573.35	$317,573.89	$ 22,999.46
Rentals—Electric building	53,907.78	38,693.22	15,214.56
Tolls	55,465.63	29,219.99	26,245.64
Loans	174,300.00	111,825.00	62,475.00
Miscellaneous	29,443.49	18,186.40	11,257.09
Total receipts	$653,690.25	$515,498.50	$138,191.75
Total	$659,419.70	$523,797.98	$135,621.72
Disbursements:			
Audited vouchers	$181,341.22	$124,086.24	$ 57,254.98
Audited pay-rolls	234,179.58	151,668.99	82,510.59
Bond interest	111,650.00	168,256.55	56,606.55*
Loans	125,239.30	74,000.00	51,239.30
Miscellaneous	1,328.25	56.75	1,271.50
Total disbursements	$653,738.35	$518,068.53	$135,669.82
Balance on hand Dec. 31	$ 5,681.35	$ 5,729.45	$ 48.10*
Total	$659,419.70	$523,797.98	$135,621.72

*Decrease.
†Six months in 1903.

TELEPHONE ON SNOWBOUND TRAIN.

The Chicago express on the Erie railroad, westbound, had a hard experience not long ago between Buffalo and Jamestown. The train encountered the most severe snowstorm of recent years in western New York. It took six hours to reach Eden Center, a village twenty-five miles from Buffalo, where the train became stalled in huge snowdrifts, some of which had filled cuts to a depth of more than twenty feet. The unique feature of this snowbound train was the installation of a telephone. "In all my experience in railroading I never saw anything like it," said Mr. Turney, conductor of the Pullman section of the train. "The snow was so deep it was impossible for passengers to leave the train. As a joke someone suggested that he would telephone home for something to eat. The suggestion was overheard by a telephone expert on board and he left the train, found a lineman in the village and within two hours a connection had been made. A telephone instrument was set up in one of the Pullman cars and passengers were waiting their turn to talk with friends from ten to 200 miles away. The train remained in this drift for fifteen hours, and the telephone service being such an innovation every passenger wanted to use it. The instrument was connected with the Home Telephone Company of Jamestown, and the Frontier Telephone Company of Buffalo, thus reaching over long-distance Independent lines. You could talk from that car as distinctly as you could from your office. I tell you it was great."

Two bills have been proposed in the Massachusetts legislature to appoint a telephone commission to "look after the Bell company."

Decisions Affecting Telephony

G. W. HAND

AUTHORITY TO FIX RATES OF SERVICE.

AN Indiana correspondent asks the question whether a city can fix the rate which a telephone company can charge for service. It may be said as a general proposition that a power in a municipality to fix a rate for telephone service must be found in some provision of the municipal charter itself. Joyce on Electric Law, page 523, in discussing this question says: "If the city has such power it must be found in a reasonable and fair construction of the charter." So far as the writer has been able to find, this question has not been decided by the Indiana courts. The identical question came up in Missouri before the Supreme court in 1888. in the case of the city of St. Louis v. the Bell Telephone Company, 96 Missouri, 623, where the rule as above stated was declared. The city had enacted an ordinance regulating the rate for telephone charges. There was no contention as to its reasonableness, only the validity of such a regulation at all was at issue. The court said the important question was whether the city had authority to enact the ordinance. If the city has such power it must be found in a reasonable and fair construction of the charter."

In 1886, in the case of Hockett v. Indiana, 105 Indiana, 250, the Supreme court decided that the state legislature had authority to regulate the rental price of telephones. This ruling has been affirmed in the followings cases:

Central Union Telephone Co. v. Bradbury, 106 Ind., 1.

Johnson v. Indiana, 113 Ind., 143.

Central Union Telephone Co. v. State, 118 Ind., 144.

As before stated, it does not appear that the question of the right of a municipality to regulate telephone rates has had a judicial hearing before the Indiana Supreme court, but the rule of law, as stated, regarding the question would undoubtedly be followed.

VALIDITY OF FRANCHISE IN KENTUCKY.

Section 163 of the constitution of the state of Kentucky prohibits a telephone company from erecting poles and wires along the streets of the city or town without the consent of the proper legislative bodies or boards of such cities. Section 3699 of the statutes of the state for 1903 applies to cities of the sixth class and provides that no resolution granting a franchise shall be passed by its board of trustees within five days after its introduction or at any time other than at a regular meeting. In a contest between the Rough River Telephone Company and the Cumberland Telephone and Telegraph Company regarding the respective rights on the streets of Hartford, a city of the sixth class, the Court of Appeals of the above state has held that a resolution of a city of this class granting a telephone company the right to use its streets, which was passed at a special meeting of the trustees and at the same meeting that the resolution was introduced, is void in that the statute has not been complied with. In the opinion the following language was used:

"A mere trespasser cannot complain that he is prevented from continuing his wrongful act. No injury is claimed to the corporeal property of the appellee. The sole injury is the prevention of the full exercise of its valid claim of a franchise in the city. It follows, therefore, under the authorities cited, that, as it has no such franchise, it cannot have received any injury of which equity will take cognizance."

The Rough River company had secured an injunction in the lower court restraining the Cumberland company from interfering with the wires of the plaintiff company. The Supreme court disposed of the question of the franchise of the Rough River company adversely and left the merits of the injunction undiscussed.

Rough River Telephone Company v. Cumberland Telephone and Telegraph Company, 84 S. W., 517.

EMINENT DOMAIN IN GEORGIA.

In an action to condemn private property in Georgia the highest court of the state has said that the courts will not aid in any attempt to condemn private property by any party until the parties in interests have exhausted every effort at settlement and have failed; in other words the inability of the parties to agree upon the compensation to be paid therefor is an essential prerequisite to the condemnation of private property for public uses. Where there has been this failure to reach an agreement the courts will grant an injunction restraining the prosecution of the condemnation proceedings until efforts at settlement have failed.

City of Elberton et al. v. Hobbs, 49 S. E. 780.

INCOMPETENCY OF SERVANT—DUTY OF MASTER.

In a recent case the Iowa Telephone Company was defendant in a suit brought by the administratrix of one Scott, who was killed while in the employ of the company. A telephone wire broke and fell across an electric wire which was highly charged, and the company being apprised thereof sent Scott to remove the wire from the dangerous position in which it was hanging in the street. Scott had succeeded in attaching a rope to the telephone wire and was endeavoring to remove it from the contact when another employe of the company, who had been sent out, came up. The latter, an inexperienced man in handling telephone wires and unaware of the dangers, as alleged by plaintiff, attempted to cut the charged telephone wire with a pair of nippers and in so doing the charged telephone wire was thrown in contact with Scott's body, from which he received a shock of electricity which caused his death. The inexperienced employe had been sent by the telephone company to assist Scott and on the ground that the company knew of his incompetency suit for damages was brought, charging the company with liability in sending an inexperienced employe to assist at so dangerous business. Notwithstanding there was dispute as to just how the accident occurred, the jury awarded a judgment of $7,000 against the company, which the Supreme court of Iowa has affirmed. The following rules of law were stated in deciding the case:

That a company is not relieved from liability for the death of a servant, caused by the negligence of an inexperienced servant, to whom it had instructed the work of repairing a defective wire, by the mere fact that the company did not know of the servant's incompetency; where a servant of a telephone company was killed by the negligence of an incompetent servant sent by the company to repair a defective live wire, deceased did not assume the risk of such fellow servant's incompetency, nor of the master's failure to intrust the work to a competent servant. The court also discussed the question of the care that a company must exercise in the interest of its employes in handling currents of electricity. "In handling electricity, or in exposing men to its currents," said the court, "reasonable care is great care."

This enormous verdict against the Iowa Telephone Com-

pany emphasizes the imminent need of greater care being exercised by companies in choosing the men who are entrusted with the duty of handling wires. Plainly enough this verdict would have been set aside had the employe who came to assist Scott been an experienced man, for in that case the fellow servant rule would have applied and no liability on the part of the company could have existed.

Scott v. Iowa Telephone Company, 102 N. W., 432.

EMINENT DOMAIN IN TEXAS.

In a recent railroad case before the Supreme court of Texas it was held that the limitation on the power of eminent domain, that property shall not be taken or damaged for public use without adequate compensation, does not of itself impose any restriction on the proper employment of the police power on any subject lying within its sphere in a proper and lawful manner.

Houston & T. C. Ry. Co. v. City of Dallas, 84 S. W., 648.

POLE RENTAL FOR USE OF STREETS.

Another suit involving the authority of a municipality to impose a fee on a company for rental for the use of streets has arisen in the Florida courts in an action by the Southern Bell Telephone Company against the city of Pensacola. By an ordinance the above company was required to pay $2 per annum "for each and every pole erected or used" in the streets of the city. The company resisted the collection of this tax, claiming that it was illegal on various grounds, among them that the city had no authority to rent the streets of the city. The following language was used by the Florida Supreme court:

"The solution of the question presented depends upon the nature of money payment for the use of poles in the streets. In the case St. Louis v. Western Union Tel. Co., 148 U. S., 92, a somewhat similar ordinance was sustained on the ground that, inasmuch as the poles permanently occupied portions of the streets to the exclusion of the public of those portions, the city had the authority to impose the charge, and it was in the nature of a rental. This power came from the right of the city of St. Louis to 'regulate' the use of the streets. It is shown by these and other decisions of the Supreme court of the United States and the Appellate courts of New York and Pennsylvania that municipalities which have the power and are charged with the duty of regulating the use of their streets may impose a reasonable charge in the nature of a rental, for the occupation of certain portions of their streets by telephone and telegraph companies, and may also enforce a reasonable charge in the enforcement of local governmental supervision, the latter being a police regulation." The following cases were cited:

City of Allentown v. Western Union Tel. Co., 23 A., 1070.

City of Philadelphia v. Postal Tel. Co., 21 N. Y. Supp., 556.

City of Philadelphia v. Atlantic & P. Tel. Co., 102 Fed., 254.

Western Union Tel. Co. v. Borough of New Hope, 187 U. S., 419.

This opinion of the Florida Supreme court is in accord with the discussion of this question in TELEPHONY (April, 1904), with the exception of the right of a municipality to impose a *rental* upon a company. In the above mentioned issue of TELEPHONY it was said that so long as the sum imposed by the ordinance is merely a reasonable fee for the expense of police regulation and control, the courts will not declare the ordinance void on the ground of it being double taxation, but if a sum is imposed as a mere rental generally the courts disapprove the ordinance on the ground that the collection of any amount with the latter purpose is illegal on the ground that it is double taxation. The Florida court does not make clear this distinction, which is discussed at length in each of the Pennsylvania cases cited.

City of Pensacola v. Southern Bell Telephone Company, 37 Southern, 820.

CONSTRUCTION OF CONTRACT.

A contract for the sale of a telephone line, in consideration of the obligation assumed by the buyers to keep the line up at their own expense, and allow the sellers free use thereof for five years, in which case the title to the line shall pass and vest absolutely in the buyers, does not, before the expiration of the five years, vest title to or exclusive control of the telephone line in the buyers.

Murphay et al. v. Smith Walker & Co. et al., Court of Civil Appeals of Texas, 84 S. W., 678.

LICENSE TAX IN VIRGINIA.

A provision of the charter of the city of Suffolk of the above state provides, "Whenever any business, trade, occupation or calling or any other thing, is to be done within the town of Suffolk, for which a state license is or may under the constitution of this state or the constitution and laws of the United States be required, the council may require a town license for doing the same." Under this authority a tax of $50 was imposed upon the Norfolk & Western Railway Company. The company resisted the collection of this sum, and suit was brought by the municipality for the collection. The case is similar to the Florida case reported in this issue of TELEPHONY, and also to the Pennsylvania cases so often referred to, but the decision is much more arbitrary in its operation against the concerns which must pay the tax. The court in citing a Virginia case said that "the payment required was a special tax, levied in the manner prescribed; that the penalty provided was a mode of enforcing its payment; and that the license when issued was only a receipt for the tax. . . . In the ordinance in question the tax is designated 'a license tax,' but its payment is not made a condition precedent to the right to do business."

In another Virginia case the court of last resort of that state has held that "a city ordinance imposing a privilege tax on a telegraph company is not in conflict with Section 4, Article 10, of the state constitution, permitting the legislature to impose a license tax on any business which cannot be reached by the *ad valorem* system. The tax imposed by the ordinance is a tax imposed upon the privilege of doing business in the city, and is wholly different from a property tax. It is immaterial that the state taxes the property of the company on the *ad valorem* system. The two subjects of taxation are wholly different, and both may be taxed without being obnoxious to the objection that it is double taxation."

It is evident that in Virginia there is no distinction between those fees of the nature of sums levied for the purpose of meeting the reasonable *expense of inspection* under the police power and mere arbitrary *license fees.* From this decision there is little remaining for the companies so taxed to do but to pay the sums levied against them.

Norfolk & Western Railway Company v. Town of Suffolk, Supreme Court of Appeals of Virginia, 49 S. E., 658.

ELECTRIC COMPANIES HELD TO HIGH DEGREE OF CARE.

The Supreme Court of Appeals of Virginia recently said that electric companies are not insurers against accidents, but they are held to a high degree of care in the construction and maintenance of their dangerous appliances. A consequence of this rule as to the high degree of care required in the use of a dangerous current of electricity is the presumption of negligence that is raised against every electric company by the mere presence of a dangerous wire in the street.

Norfolk Railway & Light Co. v. Spratley, 49 S. E., 502.

It is now almost certain that all telephone and telegraph wires will be placed underground at Augusta, Georgia.

The Telephone in Foreign Countries

RURAL TELEPHONES IN CANADA.

A LEADING Canadian paper says: "A more practical idea in Canada is that of rural telephones. Several lines have been established already, to the great convenience and satisfaction of their patrons. The farmer who is connected with his town by means of a telephone can call up a physician, or order some article required in haste, at a saving of time and money to himself. It is a great convenience, too, for intercourse with neighbors. As to the cost it need not be large, and it is one that falls upon those who adopt it. It becomes, therefore, a question to be decided on that score, as well as of the convenience, by the community interested. There is one advantage which every rural telephone line should have, and that is, long-distance connection. To insure this at rates which would not be excessive, the long-distance telephone system should be in the hands of the Dominion government. In fact, if it were under such control the question of local telephone systems, whether in town, city or country, is easily disposed of. The long-distance portion of a telephone service is, however, of such a character as to demand a monopoly, and as it is now a public utility, quite as much so as the transmission of letters, the natural place to vest such a monopoly is with the government."

* * *

TELEPHONE SITUATION IN OTTAWA.

A newspaper "special" from Ottawa, Ontario, says: "It is expected that the telephone question will again come up before the city council at an early date. Last year the Canadian Telephone & Telegraph Company made a determined fight to get a franchise to do business in Ottawa. The company, composed chiefly of United States capitalists, made a strenuous argument, but the city council could not see it their way, and an exclusive franchise for two years was given the Bell Telephone Company. The agreement does not expire until July 4, 1906, but the promoters of the new company are taking time by the forelock. Three representatives of the company are now in the city, endeavoring to get a franchise so as to be in a position to do business so soon as the agreement with the Bell company expires."

* * *

PROGRESS OF THE TELEPHONE IN SPAIN.

United States Consul Bartleman, who is located at Seville, Spain, in reporting on the telephonic situation in the land of the dons, says: "Public telephones installed by private companies numbered 15,003 December 31, 1903, of which fifty-two were central, twenty-seven branch, and 14,924 subscription instruments. The public telephone lines directed by the government were ten in number, consisting of nine centrals and one branch, and comprising 676 stations, distributed in the following towns: Córdoba, Murcia, Oviedo, Gijón, Mieres, Pola de Siero, Sama, Trubia, and León. There were thirteen long-distance lines, with stations at Madrid, Segovia, San Ildefonso, Alcalá de Henares, Guadalajara, Escorial, Jetafe, Toledo, Oviedo, Mieres, Pola de Siero, Sama, and Trubia. Official telephone lines, seven in number, were also established at Avila, Bilbao, Madrid, San Sebastián, Segovia, Tortosa, and Vich, and comprise, besides centrals, 187 installations. There were 1,096 private lines, with 2,138 stations. The total number of telephone installations operating in Spain at the close of 1903 was 17,349. Receipts derived from the domestic telephone service were $125,373."

TELEPHONE COMMUNICATION IN JAPAN.

When telephone communication was first commenced in Japan about fifteen years ago, the work was on the overhead system, B. W. G. No. 18 hard copper wires being used; but two years later No. 17 wires were adopted in all places except the northeastern districts of Houshu (including Hokkaido), when it was found that owing to the frequency of snowstorms it was safer to use No. 14 zinc-coated iron wires. In 1897 a change was made at Tokyo to No. 17 silicated copper wires, as it was found that the storms seriously damaged the lighter lines. Since 1891 overhead rubber cables have been adopted for places where the network is heavy. With the commencement of the Imperial government's expansion programme in 1896, the underground system was adopted in Tokyo, Yokohama, Osaka, Kyoto, Kobe and Nagoya for the trunk lines, and lead-covered paper cables for the others. The cables are chiefly of two kinds, one containing 100 conductors and the other fifty conductors, twenty conductors being employed in a few cases. For conduits at first only iron pipes were used, but now earthenware is also used. The whole of the iron and a portion of the earthenware conduits are imported. The lead-covered underground cables contained at first 200 conductors, but the later type have 400 conductors. In 1895 the metallic superseded the single-circuit system. For telephone poles, "sugi" timbers are used generally, though iron poles are used for the junction of cables and naked wires. The timber poles are coated with creosote or similar preparation. For a pole that does not support more than eight wires, the arms are made of "keyaki" wood. For a larger number of wires an iron arm is employed.

* * *

BRITISH PRAISE FOR YANKEES.

The London Electrical Times, in commenting on the United States census bulletin regarding telephones, speaks of the extensive spread of the telephone habit in this country as bearing evidence of the keen business insight of Americans. It recognizes that efficient telephone service is of the greatest value to a business man, and it appreciates that telephone service on this side of the water, which is so extensively developed and widely used, is of great economic value to the country. Speaking of the extent of the telephone's use, this same paper says: "In fact, in America the telephone is becoming a familiar instrument in the hands of classes that in this country would never look at such a thing otherwise than as a curiosity." The Times intimates that this extensive use of the telephone is not possible in London, due to the lack of telephone development. Further, it admits that this is a circumstance to be deplored.

* * *

THE TELEPHONE IN MEXICO.

T. F. Maguire, general manager of the Mexican Telephone Company, which operates telephone systems in the City of Mexico, Guadalajara, Leon, Merida, Monterey, Motul, Progresso, Puebla, Queretaro, Saltillo, San Luis Potosi, Tacubaya, Tampico, Tlalpam, Uman, Vera Cruz and Zacatecas, says that bids will soon be asked for the laying of conduits for the underground system in the City of Mexico. There will be 240,000 lineal feet of conduit used in the construction of the underground system, and a 44-duct subway will leave the central station in Calle del Arco de San Augustin. These ducts will be gradually reduced in number until they number about four to the subway.

They will be laid at a depth of 23½ inches from the surface of the street, and the total number of manholes will be 110. The ducts will be 3½ inches in diameter, and the cable within, which will contain 800 wires, will be 2½ inches in diameter.

At an adjourned special meeting of the stockholders of the Mexican Telephone Company, held recently in Brooklyn, it was voted to sell the company's plant to the Mexican Telephone and Telegraph Company. The latter concern was recently organized under the laws of the state of Maine and has an authorized capital of $1,000,000, of which $300,000 is preferred stock and $700,000 common stock. The basis of exchange will be three shares of new stock of which one share will be preferred, for each nine shares of the stock of the old company. There are outstanding about $1,800,000 stock of the Mexican Telephone Company, so that there will remain in the treasury of the new company close to $400,000.

The telephone between Villa de Guadalupe and Matchuala, San Luis Potosi, is expected to be ready for inauguration April 2, a national holiday.

The Sinaloa government, which owns the long-distance lines in that state, has decided to construct another line between Mazatlia and Culiacan, the state capital. The government has also decided to extend the state telephone lines into the northern district of Sinaloa.

The government of San Luis Potosi has appropriated the sum of $2,000 for the completion of the telephone line from Matehuala to San Luis Potosi.

The Mexico-American Mining & Developing Company of Torreon has awarded a contract to Phil Head of Torreon for the construction of a telephone system connecting mines and smelters. Twelve miles of wire will be used.

The long-distance telephone from Lerdo to Gomez Palacio and Torreon, in the states of Durango and Coahuila, has been opened.

John Woesner, who has secured a concession for the construction of a long-distance telephone between Durango and Torreon, Coahuila, has arrived in Durango to complete arrangements with the government of that state.

April 2 has been appointed for the inauguration of the telephone line which is being constructed from Guadalupe to Matehuala, San Luis Potosi.

* * *

TELEPHONE NOTES FROM ABROAD.

Work is in hand on the establishment of a long-distance telephone line between Naples, Rome and Turin.

The telegraph and telephone apparatus in Japan is of the most modern type. Tokio and Yokohama installed their first telephone systems in 1890.

Capt. E. Molineux, D. S. O., Indian Army, has invented an apparatus for laying field telephone and telegraph wires at a rapid rate from horseback.

In a recent fire in London the Bank exchange and the Oxford Court test-room of the National Telephone Company's system were burned out and some 6,000 telephones on the Bank exchange put out of service.

A telephone service between Sasebo and Tokio, Japan, a distance of about 1,000 miles, has been completed. It is reported that the service will be inaugurated in a few days between Sasebo and Moji, Hiroshima and Tokio.

The first telephone exchange in England was opened in London in 1879 with ten subscribers. In 1888 London had 4,900 subscribers, while at the present time there are 100,000 telephones in use. This is 54,000 less than in New York.

All overhead telephone wires at Johannesburg, South Africa, are to be replaced by underground wires. Each cable, consisting of from 104 to 612 wires, will be laid in an earthenware duct, 3¼ inches in diameter. The number of ducts in a route varies between three and forty-five, and a certain number of orders for them already have been placed. There will be about seven route miles of ducts altogether.

On and after April 1 telephonic communication will be practicable between London (and certain provincial towns) in England, and Besancon, Fécamp, Le Mans, Le Tréport, and Lons le Saunier in France. The charge for each period of three minutes' communication will be eight shillings.

The British postoffice telephone system continues to grow, the number of instruments in service having advanced last year from 14,300 to 22,000. The central exchange, which was originally equipped for about 6,000 lines, is to be enlarged to accommodate a total of 33,500 lines. Eleven branch exchanges have been opened and several are under way and will soon be ready for business.

It is proposed by the Central Administration in Melbourne of the Commonwealth telegraph system to utilize the telegraph lines between distant cities for telephone purposes, applications having already been received for telephone services between Melbourne and Warrnambool, Ballarat and Hamilton, and Frankston and Somerville. It is also proposed to establish direct communication between Ballarat and Geelong.

Regarding the use of the telephone in the Russian-Japanese war Julius Price writes to the Illustrated London News: "I happened to be in the trenches making some sketches, when suddenly the Japanese opened fire upon us from an unexpected quarter. The officer in command of the nearest Russian battery was rung up on the telephone, and in a few minutes his guns opened fire, the range being given by telephonic message."

In May, 1904, the Italian Government assumed control of the telephone system of Venice, the bad service and high rates of the private management calling forth a strong protest from the subscribers. The annual charge for telephone apparatus has already been reduced from $40 to $32, and the service is greatly improved, connection being made without delay. A plan to connect Venice and Trieste by telephone has been suggested.

The French telephone service has just accorded to the public one of those little amenities of civilization which might, with obvious advantage, be extended throughout the world. In every public office there will henceforward be hung a white linen handkerchief, treated with a chemical solution, with which every person can cleanse and disinfect the plate or tube before using it. If he will only do so also after breathing into it himself for several minutes, so much the better. These handkerchiefs are renewed daily.

The Victoria (B. C.) Colonist says: "According to a notice just issued to mariners by the department of marine and fisheries, it gives the location of the submarine telephone cable recently laid across the several channels between Vancouver Island and the provincial mainland, and the mainland in Washington. Each landing of the cable is designated by a white monument sign twelve inches wide by sixty-six inches long, with the word "cable" in black painted thereon. Mariners are instructed not to anchor in the vicinity of these cables."

The Guernsey State Telephone Service has issued its seventh annual report for the year 1904, which shows a profit of $1,400 after allowing for interest, depreciation and sinking fund. The total number of telephones is 1,044, an increase of 107 during the year. The rates are: Tariff A, $7.31 per annum and two cents per call; Tariff B, $10.96 per annum and one cent per call; Tariff C, $24.35 per annum and unlimited calls up to 3,200. Nine hundred and eighty-five subscribers use Tariff A, eighty-two Tariff B, and ninety-five Tariff C.

All telephone wires in the business section of Princeton, Indiana, will be placed underground.

Municipal Telephony in England in 1904

ALFRED R. BENNETT, M. I. E. E.

IN a recent article in the London Electrical Times, Alfred R. Bennett, M. I. E. E., who has made a profound study of the question of municipal telephony in England, says: During the past year only one new municipal telephone system—that of Hull—was brought into operation, although all the old ones considerably extended their ramifications. On December 31, 1904, the following were the figures:

Place.	Number of Switch-rooms.	Number of Instruments working.	Number of Junction Lines working.	Total number of Lines working.	Increase of Instruments since 31st December 1903.
Guernsey	7	1,373	32	1,405	158
Glasgow.....	20	12,136	834	12,970	1,504
Portsmouth ..	11	2,039	20	2,059	553
Swansea	5	1,067	11	1,078	488
Brighton	5	1,630	22	1,652	1,199
Hull	2	943	59	1,002	943
	50	19,188	978	20,166	4,845

The increase in number of working instruments since December 31, 1903, is therefore 4,845. Each center also had a number of unexecuted orders on the books, Hull having as many as 1,000.

The first place, as regards number of telephones to the population, is still held by Guernsey, the proportion now being one working instrument to 29 souls. The second place is held by Glasgow, which has over 12,000 corporation instruments and about the same number of National, making about 24,000 in all, or one working instrument to 41½ souls.

In January, 1903, I predicted that the result of the first complete year's working at Portsmouth would be favorable. Such proved to be the case, for when the accounts were published after March 31 it was found that a net surplus of £1,259 13s. remained to the credit of revenue, which the telephone committee carried to reserve for the purpose of providing for depreciation and contingencies.

In face of the expert evidence, given at the last local government board inquiry, predicting a loss, it was rather cruel of Portsmouth to make such a big profit on its first year's working, but there is every prospect of the cruelty being repeated in an even more pronounced form, since the outlook for the second year, ending March 31, 1905, is very promising. The expert witnesses were also most doleful about the cost of construction at Portsmouth, which they opined could not possibly be managed for less than an average £35. The telephone department was cruel once more, because the accounts showed that the average cost per working instrument had been £19 4s. 6d. The loan, which was then opposed, has since been expended, and the number of instruments aimed at, namely, 2,000, has been duly provided, according to the estimates.

The construction work at Swansea has also been done well within the original estimates, nearly 1,100 working instruments having been provided out of the original loan (which, in order not to seem too sanguine, had been modestly designed to cover 750 only), thus making the cost of construction a little over £18 per instrument. Of course, our opponents are at present free to indulge in their usual prognostications of financial demoralization and ruin because the first complete year's working will not terminate until March 31 next, and until that date has passed it will not be possible to demonstrate that they are wrong. There is, however, every reason to expect that Swansea will come out with a handsome surplus.

Brighton being in the same position as Swansea—that is to say, in its first year of working—is precluded in a like manner from demonstrating its solvency until after March 31 next, but here, too, expectations are good. Unfortunately, a strange complication has arisen in the Brighton accounts, owing to the premature borrowing of the whole of the capital. Owing to some misunderstanding outside the telephone department, the whole of the authorized loan was borrowed in July, 1903, before the progress of construction had rendered it necessary to make any considerable payments on capital account. The consequence has been that under the local government board regulations a whole year's sinking fund and interest on £42,000 had to be debited against the last financial year, when the exchange had only been working two or three months. Under the circumstances a large debit was inevitable, but it is quite an artificial one, and has no bearing on financial results actually due to the working. It really means that money, which was not properly repayable until 1928, was paid last year, so that the ratepayers of 1928 will have reason to rejoice at the mistake which occurred in 1903.

It is too soon to speak about finances at Hull, because the exchange there was only opened last November. The subscribers, however, are so pleased with the results obtained that practically all the instruments provided for in the estimates, namely, 2,000, are already bespoken, and it will be necessary for the corporation to ask for another loan very shortly. At the moment of writing the telephone committee is considering a recommendation to lay another 1,000 lines. The construction work at Hull was done very rapidly. The first spade was put in the ground on January 8, 1904; the central exchange began switching in September, and by November cables and switchboards for over 2,000 lines were completed, of which 760 were actually talking.

As the financial year at Glasgow ends on May 31, the accounts there were later than elsewhere, but they disappointed all the evil predictions by showing a surplus on the second year's working of £3,650 17s. 10d., which, added to the previous year's surplus of £2,092 9s. 7d., made up a profit of £5,743 7s. 5d on two years' working, which the telephone committee carried to depreciation.

The Guernsey accounts for the sixth year of working were the best yet published, there being a net profit for the year of £201 12s 6d., which brought the amount of the reserve fund up to £4,227 11s. 10d. The accounts for the seventh year—ending December 31, 1904—have been audited, but may not be published until accepted by the state. As passed by the auditors they constitute another record in the way of profit and general progress.

These results naturally make it more and more difficult for the adverse critics to keep their countenance, and this may account for their comparative inactivity during the past six or seven months. When so many corporations succeed in constructing exchanges which are voted more effective than their opponents' for £18 to £20 per instrument, it is difficult to go on asserting that a telephone exchange cannot be built under £35 per instrument.

The advance made by the several corporations has been managed in the face of the keenest opposition, frequently of the queerest kind. The National Telephone Company has reduced its tariffs in all the competing centers to well on toward the vanishing point, the idea apparently being to get every person who can possibly want a telephone onto the National system quite regardless of commercial considera-

tions, and so, by exhausting the supply, to leave the corporation without any source from which to draw subscribers.

In the face of such opposition it is rather surprising that the corporations can go on increasing. That they do so must be taken as a proof of their vitality, and that they meet a want which exists in spite of all the efforts of the opposition.

At Swansea the corporation, on the faith of the telegraphs act of 1899, and of the order which the postmaster-general made on the subject, demanded local intercommunication with the National company's subscribers. This was done against my advice, as corporation exchanges get on very well without any such complication. But the corporation was within its rights, and the postoffice, after auditing both sets of books, was good enough to certify that it was entitled to such intercommunication. But the company nevertheless declined to grant it, and as the postoffice would not make any move, an action has been commenced in the court of chancery to compel the company to fulfill its obligations under the act.

The corporation service in Swansea is on all hands asserted to outshine the opposition to such an extent as "not to be in the same street." So well satisfied of this are the telephone committee and town council that when I proposed to introduce further improvements they would have none of them, which, of course, is very short-sighted and indicative of a non-progressive frame of mind that must be admitted to be distinctly disappointing. The interesting fact emerges, however, that a telephone system which is considered perfect by its subscribers has at last been discovered! 1904 was truly a wonderful year.

The corporation of Hull has likewise gone in for intercommunication locally, and has succeeded in obtaining the abolition of terminal fees on trunk messages. It obtained these concessions by bringing pressure to bear on the company in connection with its underground ducts and cables.

The corporation of Bournemouth made up its mind recently to apply for a license, but the postoffice practically refused it on the pretext that proposals for purchasing the telephones were soon be laid before parliament. This rebuff caused the corporation to abandon the project for the present, so that the Bournemouth people will continue to enjoy the privilege of paying about twice as much for their telephones as the people of Portsmouth and Brighton.

It is satisfactory to note that some of the towns, like Liverpool, Plymouth and Rochdale, which have clauses in their wayleave agreements entitling them to share any reduction the company may make elsewhere, are moving in pursuit of their rights, and no doubt many others will do the same as soon as the existence of these differential tariffs becomes better known. By using the lever which proved effective at Hull they cannot fail of success.

SOME QUEER USES OF THE TELEPHONE.

If the telephone operator takes any interest in other people's affairs, he or she has a fine chance to find them out, since the most intimate secrets of business and domestic life are often confided to this gossiping little instrument, which plays so important a part in modern existence. Sometimes ill-assorted married couples quarrel over the telephone or make it the medium of communicating their marital infelicities to sympathetic friends. There have been carried on through the long-distance telephone courtships that have led to happy bridals.

Not long ago a Chicago young man became enamored of a voice from Pittsburg heard through this transmitter of tones both dulcet and discordant, and the acquaintance thus begun went on until the lovers met for the first time, and being mutually pleased with each other, called in a clergyman to confirm the vows they had made through a long-range telephone.

This method of forming the most important relation of life, cannot be recommended, as has been discovered to her sorrow by a Memphis girl who having been wooed and won by a wealthy Kansas man and married to him by telephone, on going out to meet her supposed husband, found that another had impersonated him on the western end of the line. Stranded in a strange city and not possessed of any Chadwickesque arts of bettering her finances, she was reduced to great straits and at length returned home sadder and wiser for her very idiotic experience.

The telephone is not an unmixed blessing. So concludes the business man who has come from his suburban home to the city, and is no sooner seated in his office than the telephone bell rings, announcing a message from his wife, who cautions him not to forget that paper of needles she told him to bring home, and bids him to add to it a spool of No. 60 thread, and to be sure not to forget the postal card she gave him to mail.

Even the children have a mania for using the telephone, and keeping it busy with trifling matters when others of serious import are waiting. Occasionally, however, things of grave importance drive them to this most obliging helper. This was the case with a little four-year-old, the daughter of pious parents, whose mother being out and not returning in time to hear her prayers, climbed up to the telephone and cried: "Hello. Central! Give me heaven!"

Telephone operators have many trials, many calls on them for services they cannot possibly perform. Often there will come a peremptory summons for attention to some very important matter, without the address either of the sender of the message or the one who is to be called up. Mr. Bellamy tells of that good time coming when people will sit quietly and contentedly in their homes on Sunday mornings and have their sermons delivered to them by telephone. We also hear of eavesdroppers, who by tying a receiver to their heads can sit down quietly to their sewing or crocheting and hear all that is being said on that particular line.

PROGRESSIVE INDEPENDENT COMPANY.

The Pekin (Ill.) Tribune, referring to the Citizens' Telephone Company of that city, says: "The new directory of the Citizens' Telephone Company is being distributed. The book contains, beside the thousand subscribers in Pekin, the names of patrons on connecting lines at Sand Prairie, Green Valley, Delavan, San Jose, Manito, Forest City, Havana, East Peoria, Chillicothe, Lacon, Spring Bay, Tremont, Dillon, Allentown and other places. The Citizens' company also has connection with exchanges in nearly every town within 100 miles of Pekin. Inside of a month the Peoria Independent company will be ready for business, giving the Citizens' connection with several thousand more subscribers. Lines to Chicago are now building and within a few months Citizens' subscribers may be able to talk to friends in the Windy City.

"The Citizens' has been in operation only two years and is handling 95 per cent of the business in Pekin. It has connection with 1,500 farmhouses in this vicinity, and saves many a trip into the country. People are now using the Citizens' book as a city directory, so completely does it cover Pekin. New names are being added daily and it is only a question of time until every home has a Citizens' telephone."

An ordinance is being considered by the township committee at Morristown, New Jersey, for granting permission to the Delaware & Atlantic Telephone Company to lay underground conduits.

Telephony in Railroad Realms

COMPOSITE lines—wires primarily designed for telegraph working, but equipped with telephones for use, to a limited extent, simultaneously with the telegraph instruments—may now be found on many different railroads in this country, says the Railroad Gazette; and so extensive a use of this inexpensive convenience warrants a word of notice. The American Telephone and Telegraph Company has furnished "composite" apparatus for forty-five roads.

On many of the composite wires there are two or more intermediate offices equipped with telephones. There is often a tendency, because the equipment is adaptable, to load lines with eight or ten stations. This is entirely proper when the traffic per station is small, but the traffic growth is likely soon to render the service very unsatisfactory. When there is much traffic there is usually considerable delay in obtaining the circuit, and any two stations using the line will, of course, prevent all the others from using it.

Sometimes the composite is applied on several sections of line in immediate sequence, with a switch at the junction of two contiguous sections, so that different sections may be in simultaneous but independent use, or the sections may be connected through for service between a station in one section and a station in another. Various combination have been effected in this way.

Portable telephone sets may be used in conjunction with any of these arrangements. The portable set is designed for emergency service at points along the road where there is no convenient telegraph or telephone office. Besides being a valuable adjunct the portable set is very useful in itself, for communication is often possible over a deranged pole line when it is not possible to communicate by telegraph. In the case of a line break there may be no continuous metallic conductor, but the telephone system is still workable, because the excessive induction between parallel wires, worked as single circuits with earth-return, permits communication by induction; then the cross-talk, so annoying under normal conditions, is extremely useful.

The number of these stationary and portable sets now in use is very large, and the total length of composited telegraph wires is about 20,000 miles. This means about 20,000 miles of railroad, for in practically all cases there is only one composite on any one line of poles. This has been a quiet but useful adaptation of means to ends, under circumstances where expenditure for a more elaborate installation would not have been warranted. The demand was for inexpensive facilities on lines—grounded telegraph lines—already owned or controlled by the railroads. These being used there is no expense for station equipment.

The telegraph lines are not usually efficient telephone circuits, because of the use of the earth as a return conductor, the excessive induction between two or more parallel grounded lines, and the defective conductivity of old iron wires, especially the poor joints. Special means must be adopted for eliminating the noise and for making calling signals without interfering with the telegraph. But all these difficulties have been successfully met.

A calling-signal system which is not independent of the telegraph flutters the telegraph relays. This is a simple method, but it is a serious annoyance and delay to telegraph traffic if the telephone is used frequently. Owing to the excessive cross-talk between parallel grounded lines, it is not possible to operate two parallel circuits independently, on the same pole line. Part of the efficiency of the receiver is sacrificed in eliminating the noise found on these lines when ordinary telephones are used, and so a special arrangement was devised. It is usually the case that the talking efficiency exceeds the signaling efficiency, as regards distance. Good talking has been obtained for more than 200 miles; but the distance to which good service can be obtained on a copper circuit of No. 9 B. & S. gauge (208 lbs.) is about 200 miles when there are no intermediate telegraph instruments; the presence of each intermediate shortens the line a few miles if uniform service is to be obtained. On No. 8 B. W. G. iron (378 lbs.) the limit is about 100 miles, and on No. 9 B. W. G. iron (305 lbs.) about 80 miles, for wires of B. B. grade which have not depreciated.

The existence of any considerable amount of cable is always a serious difficulty, especially rubber-covered cables without a metal sheath, because of excessive induction and low telephonic efficiency. A metal sheath, connected to ground frequently, is of material assistance in reducing induction between earth-return circuits in cable.

If these difficulties and obstacles are intelligently dealt with, and energies are not wasted on attempts to telephone beyond reasonable distances, this means of communication will be found adaptable to a great variety of situations, and there is no reason why it should not be made to afford the surpassing benefits of telephone communication in innumerable cases where the expense of building a metallic-circuit Independent telephone line would be entirely unwarranted.

* * *

Chicago papers are authority for the statement that the recent contract made by the Chicago & Alton railroad for a telephone system connecting the towns tributary to St. Louis with the Alton's own wires, is the first step toward completely equipping the road with telephones. It is stated that the new exchanges at East St. Louis is but one of fifty exchanges to be installed and that when completed the Alton will have its private telephone system from Chicago to St. Louis, and from Bloomington to Kansas City, to be used exclusively for company business. It is not the intention to use the telephone service in the operation of trains, as is said to be the object in the case of other roads which are building telephone lines, but simply for the expediting of company business, the bulk of which can be handled quicker and better in this manner than by telegraph.

* * *

In a letter to the Railway Age, L. L. Featherstone, secretary and superintendent of the Gulf & Interstate railroad of Texas, describes the operation of seventy miles of the road by telephone exclusively, as follows:

"We consider the telephone far superior to the telegraph in handling trains, especially on a short line. In the first place, the employes are directly connected with the business they desire to be informed on, can communicate directly with the party from whom they want advice, and in this way can more thoroughly understand what is required of them than they could if forced to use the telegraph.

"Trainmen can all carry a telephone box on their trains, and in case of accident they can cut in anywhere on the line and fully report the trouble to those interested. Besides this great advantage, the section men can have a telephone in every section house and receive instructions at any time of the day or night, when, on the other hand, they

could not be reached by telegraph possibly for several hours. The cost of maintaining the telephone is nominal, and the cost of the operators in most cases is nothing at all."

* * *

The value of the telephone as an aid to operation has become well appreciated of late in the electric railway field, but a very casual study of the instrument's use shows that the full benefit of the apparatus is often missed in practice, says the Street Railway Journal. The use of the telephone is such a simple matter that the press of other business frequently crowds out the consideration which ought to be given to the design and installation of any system of communication upon an operating road. Instruments are likely to be set up without much regard to extraneous conditions, and there is a tendency in more than one repair department to let the apparatus alone after it is once installed, unless it becomes flagrantly out of order. The importance of keeping the cars moving casts such a large shadow over the odds and ends of work which are always waiting to be accomplished that it is hard to find time to maintain the telephone system in perfect condition, even on interurban lines which depend upon it for the safe movement of their traffic.

It is worth while in this matter to take a leaf from the book of the steam road, which generally spares no pains to keep its telegraph lines and apparatus in good condition. The safe and expeditious handling of both freight and passenger traffic is so bound up in the telegraph system of the modern railroad that a break-down of communication demoralizes business to the verge of paralysis.

The electric road is prone to make the mistake of getting along with a system of telephones which works only passably well. This is often not so much the fault of the apparatus as it is the error of those who install the equipment. It is no uncommon thing to find a sub-station telephone, for example, set up without any sound-proof booth in the midst of operating machinery which renders the reception and transmission of speech nearly impossible; in other cases the telephone will be installed in a corner of a dispatching office in such a way that the dispatcher is obliged to turn his back upon the tracks when talking, and in still other instances the dispatcher has to raise himself in his chair in order to see the tracks which he governs, thereby laying himself open to the chance of cutting off part of his conversation with trainmen at turn-outs at times when every word is of critical importance. Misunderstanding of orders and all that it implies hang over an imperfectly working system like the famous sword of Damocles, and in times of emergency both life and property may go to the fall through the indistinctness or interruption of the telephone service. In like manner the importance of equipping large power stations with extension sets is not always appreciated. A plant of 10,000 or 15,000 kilowatt capacity deserves more than a single telephone mounted on a second story switchboard gallery, perhaps 50 feet above the engine room floor, accessible only by two or three long flights of stairs.

Considerable advantage arises on city systems in having telephones located near the posts of inspectors and starters whose duty requires them to be in close touch with both the street traffic and various car houses and division headquarters. In case of break-down it is most convenient to be able to send for the emergency crew within a moment of the accident's occurrence, and when such delays happen in rush hours every half minute cut from the blockade time means money in the company's pocket. The cost of installing a telephone set in a locked box near the busiest tracks of a system weighs but little against the saving effected by inspectors being able to call up any department at a moment's notice. The cost of relieving a blockade generally amounts to a comparatively small sum of money, the vital element being the time required to set the system in motion.

As for the type of telephone apparatus best suited to electric railway purposes there is little doubt that the common battery central-energy system is superior to every other form of equipment, at least for city roads where the distances of transmission are short. Some form of automatic apparatus may do well enough for the departments of a repair shop, but experience seems to indicate that for serving the whole street railway system, from the street to the office of the manager, the centralized battery apparatus possesses great advantages in point of quickness and simplicity of operation, coupled with moderate maintenance charges. Here, as elsewhere, inferior equipment is dear at any price.

* * *

As the result of the recent visit of General Superintendent J. H. Young of the Colorado & Southern to Cheyenne, Wyoming, the composite railway telephone system is being installed over the Cheyenne & Northern branch of the road, making this one of the few railroads in the west to be equipped with this novel invention. By this system the telegraph wires of the company can be used for telephone purposes. Instruments have been placed in the headquarters at Cheyenne and in the various stations along the line. All freight and passenger trains also will be equipped with outfits so that telephonic communication can be opened up instantly at any point along the line. The system greatly increases the facilities of handling trains, giving instant communication with headquarters in the event of wrecks. In case of the breaking down of the telegraph system, the new system can at once be connected with the nearest telephone lines and communication restored.

* * *

In a short time the Panhandle railroad will have a private telephone system installed over the entire line from Pittsburg to Bradford, Ohio. Following the news recently published that the railroad will have its own telephone service between Pittsburg and Dennison, which will ultimately be extended to Columbus, comes the information that the office of O. W. Runyan, trainmaster of the Indianapolis division and the Columbus terminals, is to be connected with that of J. F. Nolan, general yardmaster at Bradford, by a composite telephone and telegraph system. Work upon the installation of the necessary apparatus is being carried on at both ends of the line, a telegraph wire being used for the connection.

The Independent telephone line which is being constructed on the Panhandle system is one of the most important projects of that road. C. A. Cellars, general superintendent of telegraph of the Pennsylvania lines west, has charge of the work. When it is completed the various division headquarters will be connected and the officials will be enabled to give and receive orders with greater accuracy than is possible under the present system. The plans for the line were authorized some time ago, and a part of it was completed last year when telephone connection was established between Pittsburg and Steubenville, connecting the main office with the various yard and division offices along the line.

* * *

The Gulf & Interstate railroad, which runs from Beaumont, Texas, to Port Bolivar, situated opposite Galveston, uses the telephone in its operation. The distance is eighty miles, and there is quite a heavy traffic over the road. The road has no telegraph service whatever, and the movement of trains is handled entirely by means of the telephone.

* * *

Work of extending the telephone service between New York and its western terminals is rapidly being pushed ahead by the Erie road. Connection of Cincinnati and Chicago with the general office at Cleveland by telephone is to be made within the next few weeks.

Jungle Savages Operate Telephone System

M. C. BARRY.

IF you belonged to a scientific exploration party in central Africa and had lost your way in the dense forests of the Congo; and if after untold hardships you had been captured by savage negro tribesmen; if as a prisoner you had been taken to a great village in the center of a jungle and been confined in a hut lighted by an incandescent electric light, you would be surprised, naturally.

If after this experience you had been taken before the chief and had found him a black, fat, half naked savage, seated on a throne of elephant tusks, covered with a leopard skin, behind a rude table on which, beside a huge war club, a skull, and one or two bones unmistakably human, there stood a handsome nickel-plated desk telephone, you still would be surprised. And, if finally, you had heard the familiar sound of the telephone bell and had seen this same black, fat, half naked savage chief take the receiver from its hook, place it to his ear, and carry on a conversation in an untranslatable gibberish, you would have been moved to astonishment.

And yet these things happened to Lieut. Emile Andrée, a former officer of the Belgian engineer corps, and to John Haddin, a chemical engineer, both in the employ of a Congo-Belgian mining syndicate. Andrée and Haddin have just arrived at Mombassa, on the coast of British East Africa, and their story is bound to excite the wonderment of all the learned and scientific societies in Belgium.

Lieut. Andrée and John Haddin joined a surveying and exploring party at Stanley Falls station on the Lower Congo river on March 26, 1903, with the purpose of marching overland to Lake Victoria Nyanza. Their object was to explore the great interior of central Congo in search of dyewood and rubber forests, and to examine the countain ranges between Albert Edward Nyanza and Victoria Nyanza for gold, copper and iron.

As this is not a story of the exploration of the Congo but only of a most singular adventure, no attempt will be made to relate the hardships of the journey across the dark continent. Suffice it to say, that the party of 129 men, of whom five were white and the others natives, employed as carriers and soldiers, left Stanley Falls station on June 26, 1903, ascended the Lower Congo river in steam launches to Kibonge, passing safely the five cataracts of the river. From Kibonge, the overland march began, the route followed being the old trail of the ivory raiders, northeast, 550 English miles, to the Ituri river, where it flows into the Upper Congo. The exploration of central Africa in these days lacks the glamour of danger that surrounded it in Stanley's days. The party was well equipped and marched for 160 days through forest, bush, and jungle without meeting an adventure outside of those familiar to exploring parties. The expedition passed through endless miles of forests in an absolutely unknown region.

On December 3, 1903, the party reached Ujangwa, forty miles south of the Upper Congo, where they rested in a large village for several weeks. Ujangwa has been frequently visited by the numerous exploring parties which have ascended the Upper Congo under direction of King Leopold and the companies which are exploiting the Free State for personal gains. At Ujangwa, Lieut. Andrée learned from a native who was able to make himself understood in a queer mixture of English and French, of gold mines said to exist eighty miles to the southwest, in a range of foothills skirting the mountain approaches to Albert Edward Nyanza.

The story seemed probable enough to warrant investigation, and Lieut. Andrée and John Haddin met a company of sixty-seven carriers and gunbearers and started for the spot. It was in the attempt to reach this mythical gold mine that the two men met with their extraordinary adventure. The road—or the way, for there was no road—passed through the jungle. Twenty natives, with billhooks and axes, were constantly employed in clearing a pathway. Sometimes an entire day would be consumed in going a single mile.

One by one the natives either sickened or died, or deserted. After four weeks of slow progress, Lieut. Andrée and John Haddin found themselves almost alone, with only four faithful natives to aid them. Still they pressed on, thinking all the time that at best they could find their way back by the trail they had blazed through the undergrowth.

One day, six weeks after they left Ujangwa, Andrée and Haddin burst through the jungle to a broad highway leading directly to a large village. The highway was nearly eighty feet wide and had been carefully cleared of trees, bushes, and vines. One hundred yards away, in front of the village walls, stood a group of fifty natives, shouting, gesticulating, with drawn bows in their hand. Escape was impossible, and so Andrée and Haddin made the best of their predicament and advanced toward the gate of the village. They received a hostile reception, for in a moment they were surrounded and attacked by half a hundred black savages. In an instant both had been knocked senseless by huge war clubs, and until the next day knew no more.

When Haddin regained consciousness he found himself bound hand and foot in a dark hut. While he was wondering in a dull way whether the lieutenant was alive or dead someone came into the hut. Haddin could see in the dim light that the visitor was a savage, for he could see the naked limbs moving. All at once the savage stretched a long, bare arm up into the air, there came a familiar click, and the next instant the room was flooded with electric light. Haddin was so astonished at the sight of an incandescent bulb, hanging by an ordinary insulated wire from the ceiling of the hut, that at first he could scarce believe he was in central Africa.

The savage black set on the ground a calabash full of some kind of greasy soup, with chunks of meat floating around in it. Another calabash contained water. Cutting the withes that bound his captive's hands the black squatted on the ground and began to eat, motioning to Haddin to do the same. When Haddin had satisfied his hunger the black motioned to the wall of the hut. Haddin, who had been sufficiently astonished by the sight of a modern electric light in a savage village in the center of an African jungle could only stare helplessly at a telephone attached to the wall. It was unmistakably a telephone of the ordinary pattern.

The black went to the telephone, pulled the receiver from the hook, turned the crank and spoke something to somebody at the other end of the wire. Then, grinning until every ivory tooth in his head was in sight, he motioned for Haddin to take the receiver. Haddin approached the mouthpiece with his lips and called "Hello." He couldn't think of anything else to call. He said afterward that the sound of the lieutenant's voice as the latter answered was the pleasantest word he ever heard spoken. Haddin and Lieut. Andrée held a long conversation over the wire. The lieutenant, it seemed, was a prisoner in the largest hut in the

village, evidently the chief's residence. He could offer no explanation of the electric light or the telephone.

"I'm surprised at nothing," he said to Haddin over the telephone. "If there is a daily paper, a stock exchange, and a roulette game in this village, I'll not be surprised in the least."

The next day Haddin and Lieut. Andrée met in the chief's hut and were taken into the presence of the chief himself. If they had expected to find a solution in the mystery of the electric light and the telephone there in that jungle town in Africa they were disappointed. Haddin had read of Americans and Frenchmen who had been made kings of savage tribes in different parts of the world and he had a dim idea that perhaps the chief would prove to be a white man in disguise.

But it was not so. The chief was a big, fat, dirty negro, beyond question a savage. His only garment was a leopard skin. He sat on a "throne" ornamented in a crude way with ivory tusks. In front of him was a rude table covered with a lion skin, the head with its sightless eyes hanging down in front of the table, and this formed a screen for the fat, squat legs of the native chief. There was a human skull on the table and one or two bones. Haddin naturally expected to see such grewsome objects; but he was surprised to see beside the skull a handsome nickel-plated desk telephone with its green insulated wire trailing over the side of the table and along the floor.

Several times during the "powwow" the chief shook his war club angrily at the desk telephone as if he would smash it. Evidently he was angry at it. Finally, in a burst of anger, after vainly trying to talk through the telephone, he raised his club with the determination to demolish it. A quick exclamation from Lieut. Andrée attracted the attention of the chief. Andrée pointed to the telephone and then to himself. The chief comprehended that Andrée could repair the offending telephone and motioned for him to try.

Andrée made a hasty examination and discovered that one of the little screws that held the hoop upon which the receiver hangs had become jammed, so that when the receiver was removed the spring would not release the hook, enable it to rise, and thus establish the circuit to the central office. It required but a moment to repair the damage. A grin of satisfaction came over the chief's face as he lifted the telephone and discovered that it worked as well as ever. Andrée's knowledge of the telephone saved his life as well as that of his friend; from that time they had the freedom of the village.

They discovered that somebody had installed a small electric lighting station of twenty-five lamps, the dynamo being run by a turbine water wheel in the river. The telephone system comprised only four instruments, but it had been well installed with doubly insulated wire. There was actually a "central"—a grinning darky.

Haddin and Lieut. Andrée remained in the village two weeks and in all that time they never discovered the presence of a white man or found any of the natives that could speak English, German, French, or any modern language. When they left the village they had not solved the mystery. They have not solved it to this day. They made their way back to Ujangwa, rejoined their party, and traveled eastward to Lake Victoria Nyanza. The English railroad took them to Mombassa.

How did the electric lights and the telephone find their way to central Africa? No one knows.

It has been guessed that some scientific explorer visited the spot and installed the systems for his own use or for the amusement of the natives. But if so, what became of him? Was he killed after he had taught the natives the use of the scientific wonders? Another theory is that the telephone and lights were installed by negro graduates of American technical schools who made their way to central Africa in the hope of setting up a kingdom of their own. Who knows?

HOW TO TELEPHONE.

There are various simple matters connected with the proper and improper use of the telephone, which, if generally understood and heeded, would make this very convenient instrument of communication, if not a thing of beauty and a joy forever, at least very much more satisfactory than many people now find it to be. One thing appears to be tolerably certain—that everyone does not know the way to get the best results. A common mistake by those who use the telephone is that they do not place the lips close enough to the instrument. This, perhaps, is due in many cases to the fact that the old style instrument was a very different thing from the present one. In the former case it was necessary to keep the lips some inches distant from the box—to speak across the opening and not into it. "Get farther away from the telephone" was a familiar command when the old style instrument was in use, and many old subscribers cannot get over that "long-distance habit," and the command to "talk louder" is often heard. Another reason for the failure to place the lips close to the transmitting mouthpiece is the fear of germs which, naturally enough, perhaps actuates many.

"Public telephone users who know that it is necessary to get close to the telephone," said an observing operator to me the other day, "and who object to the moist or possibly unclean mouthpiece, often give the rubber piece a thorough wiping with a handkerchief before talking. Some go even further and form an auxiliary mouthpiece by circling the rubber one with their hands, thus keeping the lips entirely away from it. You will hear people yelling at the top of their voices, though that class is diminishing every day, for it is becoming better understood that a moderately low tone with the lips close to the instrument secures the best results."

The operating part of the telephone mechanism, the diaphragm and the carbons, being in the disc back of the hard rubber mouthpiece, it is absolutely impossible to get too close to it. The voice of the speaker has much to do with the distinctness of the message. The worst telephone voice is the basso profundo; the man who in ordinary conversation can be heard like a megaphone above all others is usually asked to repeat. He could save himself a lot of trouble and his listener as much inconvenience if he would strike a higher key than is natural to him. As a rule women's voices are the best for ordinary telephone work, but not for long-distance service. Then a strong, clear voice is required. Having a good telephone voice, however, is not the whole thing. The good speaker must enunciate distinctly. The one who jumbles his words in ordinary conversation can be understood by the person in front of him notwithstanding his imperfect manner of talking, because the listener sees the speaker, and the eye assists the ear, but on the telephone it is quite different and "Can't understand you" is a frequent reply.

Defective enunciation has caused many to believe that certain sounds will not carry in the telephone, like "s" and "th," etc., but these sounds will carry all right and be understood if the person who utters them does so distinctly. Said an expert: "If I were to lay down a rule for telephoning, I should say, keep the chin well up and speak with a large amount of air in the chest, articulate slowly and distinctly and use the lips; that is, throw the voice in the front part of the mouth—and be courteous."

The Nashville (Tenn.) Home Telephone Company, recently incorporated with a capital stock of $100,000, proposes to place its wires underground.

Telephone Tales Tersely Told

A $150,000 Independent telephone company has been organized at Yellville, Arkansas.

The Lakota (N. D.) Telephone Company will build thirty-five miles of new lines this summer.

Because of increased business the United Telephone Company is arranging for a second exchange at Huntington, Indiana.

The stockholders of the Winnebago County (Ill.) Telephone Company, at a recent meeting held in Rockford, voted to borrow $15,000 to complete the work of construction.

The Black River (Ohio) Telephone Company has authorized the expenditure of $15,000 for the improvement of its local service. An exchange will be installed at South Lorain.

The Athens, Georgia, telephone exchange is to be thoroughly remodeled and the common battery system installed. The work of installation will be started early in the season.

Improvements to the amount of $50,000 will be made in the telephone system at Tulsa, Indian Territory, in the near future. Provision for more than 2,000 additional telephones will be made.

The Home Telephone Company of Logansport, Indiana, has arranged for the enlargement of its switchboard capacity. There are 1,960 telephones in operation and the capacity will be raised to 2,380.

Owing to its rapid growth the Independent telephone company at Princeton, Indiana, will be compelled to enlarge its facilities. A new switchboard of double the capacity of the old one will be installed.

Indian Inspector J. George Wright has been directed by the Secretary of the Interior to proceed at once to collect all taxes and damages from telephone companies operating lines in Indian Territory.

The Saginaw Valley Telephone Company, which was recently organized in Michigan with a capital stock of $850,000, will take over and extend at once the property of the Valley Telephone Company.

The Home Telephone Company of Hamilton, Ohio, has made an offer for the purchase of the Bell company's interests in Hamilton, and negotiations are now pending for the consolidation of the two companies.

President Atwood of the Noble County (Ind.) Telephone Company is credited with the statement that his company has recently purchased all the interests of the Bell company in Noble county and will take possession June 1.

The Alabama Independent Telephone Company has been organized with a capital stock of $500,000 to construct a line to Louisville, Kentucky, connecting with other Independent lines as far east as Albany, New York.

The South Bend (Ind.) Home Telephone Company, which began operation two years ago, in opposition to the Central Union, now has 3,500 telephones and has just decided to put in an automatic system, the first to be used in Indiana.

A force of Utah Independent Telephone Company employes is erecting telephone poles and stringing wires on the State road, near Salt Lake City, the present destination being Provo. An exchange will probably be established in Lehi.

The Atlanta (Ga.) Telephone Company contemplates extensive improvements, including additional sections to its switchboard. About 90,000 feet of cable has been ordered and the company intends to proceed at once with the improvements.

The Mutual Telephone Company of Shelbyville, Indiana, is considering an extensive improvement which, if made, will cost thousands of dollars. The company has an electrical engineer preparing plans and specifications for an entire new plant.

An Independent telephone system is in course of organization by the farmers around Fort Madison, Iowa, with the expectation of connecting with the Mississippi Valley exchange at that place and Keokuk. They anticipate making an extensive circuit.

The People's Home Telephone Company of Birmingham, Alabama, has secured a franchise to extend its lines to Woodlawn, a suburb of Birmingham, with 5,000 population. Several other towns in which its own franchise will be added to the list soon.

The Home Telephone Company of Crawfordsville, Indiana, and the various Independent and co-operative companies of Montgomery county, have effected reciprocity arrangements whereby a subscriber at any point in Montgomery county can reach any other. By this arrangement the 3,000 telephones outside of Crawfordsville are given connection with the 2,000 subscribers to the Home company, making it possible for any subscriber to talk with any one of the 5,000 others without toll charges.

The Crescent Telephone Company of Wesson, Ohio, which began business five years ago with thirty-five subscribers, now has 1,000. The company has many orders for telephones, and contemplates extensive improvements as soon as the weather permits.

The opponents of the Bell company are determined to establish an Independent telephone service in Middletown, New York, and it has been decided to organize a new Independent company there to be ready to make contracts and secure any desirable property.

The Morrison Telephone Company, with headquarters at Swanville, Minnesota, will construct nearly 100 miles of new line this spring. This system was built by John Stroman four years ago and now has about 150 miles of long-distance lines, beside several important farm lines.

Manager S. C. Kissner of the Coshocton (Ohio) Citizens' Telephone Company has closed a contract for the installation of a farmers' telephone line to be constructed at once between the towns of West Lafayette, Orange and Bakersville, which will be made a part of the Citizens' Telephone Company.

The New York Independent Telephone Company proposes to erect a telephone system in New York city, thence to Albany and Boston, connecting intermediate cities in New York, Massachusetts, Rhode Island and Connecticut, and also through New Jersey and Pennsylvania to Jersey City, Philadelphia and other places.

The New Long-Distance Telephone Company of Indianapolis announces the opening of direct service between that city and more than 2,000 Independent telephone exchanges and toll stations in Ohio, aggregating 190,000 telephone subscribers, including more than 30,000 in Cleveland, Columbus, Dayton, Hamilton and Toledo.

The Southwestern Telephone Company of Enid, Oklahoma, recently sold its telephone lines in Enid, Alva, Harper and Anthony, Kansas, and other lines, to the Pioneer Telephone & Telegraph Company of Oklahoma City for $180,000. It is stated that Enid will be northeastern headquarters for all lines in Oklahoma and Kansas.

A private branch exchange instructor has been appointed by the Cuyahoga Telephone Company of Cleveland. Her duty will consist in visiting all private branch operators, observing their method of operating, giving them whatever suggestions are necessary as to the proper manipulation of the board and demonstrating how to obtain the best results.

Harvey Mires of Kentucky and F. C. Smith of San Antonio, owners of the Independent telephone exchange at Corsicana, Texas, are considering the advisability of rebuilding it. It is estimated that the damage by the recent cold spell amounts to $10,000, and the officials will request that the city council allow them to increase rates for the present at least.

At the recent annual meeting of the Ontario Telephone Company, held at Oswego, New York, it was shown that the company now operates 1,715 telephones, about 925 of which are in Oswego. Contracts made and new business in sight will shortly swell this local list to over 1,000. This growth has necessitated extensions to the switchboard, which have already been made and more are contemplated.

The Dubois County Telephone Company of Huntingburg, Indiana, is in a most flourishing condition, having installed 260 new telephones in the last year and having now in service 1,085 telephones in the county. The value of the plant is estimated at $43,000. The company will in the near future place a new switchboard in the Huntingburg exchange, with a capacity of 500 drops.

A movement is on foot to establish an Independent telephone company in New Orleans, with a capital of $1,000,000. Among those at the head of the enterprise are Dr. E. B. Craighead, president of Tulane University; F. H. Farrar, of the law firm of Farrar, Jones & Kurttchnitt, and W. P. Brown. The latter will probably be president of the company. Application for franchise has been made.

The annual meeting of the stockholders of the Crooksville (Ohio) Telephone Company was held at Crooksville recently and the capital stock of the company increased from $10,000 to $25,000. The following board of directors was elected: J. L. Bennett, S. R. Souders, J. C. Moore, William Harris, Thomas F. Wilson, H. A. Skidmore and J. B. Rhodes. The board organized by electing J. B. Rhodes, president and general manager; H. A. Skidmore, vice-president; William Harris, secretary, and J. L. Bennett, treas-

urer. The system has had a very substantial growth during the past year and the showing made was highly gratifying to the stockholders.

Elias Falb, a farmer living near Orville, Ohio, has some queer ideas about the telephone, which he believes is an evil thing, and quotes scripture as a proof. He says Paul teaches "Be ye not unequally yoked together with unbelievers," etc. Spiritually, then, the telephone is a sinful network, according to his belief. The Mennomites, to whom Falb belongs, have many queer ideas about things worldly.

Twenty members of the Nashville, Tennessee, city council were visitors in Louisville, Kentucky, recently, to inspect the plant of the Home Telephone Company and to investigate telephone conditions there. An application for a franchise by an Independent telephone company is pending in Nashville. The party was entertained at luncheon at the Pendennis Club by A. L. Tetu, manager of the Home Company.

The Stoddard-Osgood Telephone Company, which was incorporated at Monroe, Michigan, recently, is to succeed the Stoddard Telephone and Construction Company, and its object is to build, operate and maintain farm lines and local and long-distance lines in Michigan and adjoining states. Among those interested are Warren Stoddard and Harry S. Stoddard of Monroe, and C. L. Osgood of Temperance.

The Bellechasse Telephone Company of Quebec, Canada, is the largest Independent company in the Dominion, having 2,110 miles of pole line construction, 2,700 subscribers and a paid-up capital of $130,000. The main office is in Quebec. Dr. J. F. Demers is general manager of the company and recognized as one of the best and most energetic telephone men in Canada. The company deserves continued success.

The New Long-Distance Telephone Company of Indianapolis has just issued a handsome map that shows the number of points reached in the state, gives the number of Independent telephones in each county, etc. The map shows that in the state there are 368 Independent exchanges, 1,560 toll offices, 30,000 miles of toll line wires and 166,255 telephone subscribers. Marion county, with 11,591 telephones, leads the state in numbers.

A large amount of construction work will be done on Independent long-distance telephone lines in Wisconsin and the northwest the coming summer, according to a statement made by Manager Bowee of the Consolidated Company of Minneapolis. Mr. Bowee stated that his company built 600 miles of new line last summer, including the line of Winona and La Crosse, and expects to push on to Madison and other cities in the state the coming season.

According to the census bureau, California, in 1902, led every state in the Union in the number of telephones in proportion to the population. The figures show that there were only fourteen people to each telephone in that state, while in Alabama, the state with the fewest relative number of telephones, there were 134 people to each instrument. The development on the Pacific coast is considered phenomenal by those who have made a study of it.

The city council of Hattiesburg, Mississippi, and the Retail Merchants' Protective Association have opened a campaign against the Cumberland Telephone Company, to compel that corporation to lower its rates and improve the service or surrender its franchise to the city. City Electrician Potter has completed a report upon the quality of material used and service rendered. It states that the service is not up to the standard that the company promised. It has been found that the company is raising its rates.

The Farmers' New Era Telephone Company of Hebron, Illinois, which was organized a short time ago, has increased its capital stock and has purchased all of the interests of the Citizens' Telephone Company in the townships of Chemung, Alden, Richmond, Burton, McHenry, Greenwood, Hartland and Dunham, and expects to fully develop all this territory. There is a great demand for telephone service in this territory and the outlook is very flattering for a thorough development of the telephone business in the northern part of McHenry county.

The Minnesota Central Telephone Company of Willmar, Minnesota, owns and operates nearly 2,000 miles of toll line and twenty-six local exchanges, with 3,700 subscribers. The increase in earnings for the past year was $17,813.68. During the year the company has added 466 miles of copper wire and seventy-six miles of iron wire, and added 200 patrons to its exchanges. Plans for the coming year contemplate an expenditure of $75,000. A number of its lines will be replaced with metallic circuits, and the capacity of several of its exchanges will be enlarged.

It is stated that an Independent telephone company has been formed at Johnstown and Gloversville, Fulton county, New York, to occupy the territory which the Bell trust endeavored to appropriate by its deal with the Glen company. The monopolistic extortion practiced by the trust in Fulton county has aroused a spirit of resentment there. This action is similar to that taken by the people in the territory of the Oneonta company, which the Bell trust endeavored to control. The new company will connect with the Interstate company on the west, and the Independent lines on the east and south, and with the Independent long-distance line which connects Utica and Amsterdam and the east, in spite of the defections of the Glen company, which was expected to defeat that project.

The young women employed in the operating department of the Kansas City Home Telephone Company have organized a mutual benefit association. The officers are: President, Miss A. Hammell; vice-president, Miss Bessie Manley; secretary, Miss Triaphine Garvey; treasurer, Miss Maud McCollum. The organization has a membership of more than 200. The initiation fee is fifty cents and the monthly dues five cents. Dances and entertainments will be given from time to time to increase the benefit fund. It is proposed to pay a sick benefit of about $5 a week.,

The farmers and ranchers in the western part of Colorado have decided to bring themselves in closer communication with one another, and the filing of articles of incorporation of the Elk Mountain Mutual Telephone Company with the secretary of state is the first step in this direction. The company is formed by the farmers of Routt, Larimer, Rio Blanco, Eagle and Grand counties, and telephones will be installed on most of the farms in those counties. Work on constructing the lines and putting in the instruments and switchboards will begin almost immediately. The capital stock of the concern is placed at $37,500. The principal office will be at Steamboat Springs, Routt county.

Three New York companies—the Baiting Hollow & Roanoke Telephone Company, the North Shore Telephone Company of Port Jefferson and the Suffolk County Telephone Company of Patchogue—have reached an agreement to connect the lines of all three companies. These are in competition with the New York and New Jersey Telephone Company for their share of the business of the island. The Baiting Hollow company, which has about 300 subscribers, has recently purchased a large building at Riverhead to be used as a central station, and the company is also planning to cross the island to operate in Westhampton, Quogue, East Quogue and Good Ground. This company began with a capital stock of $500 and now claims $20,000 to work with, and is earning about 12 per cent on its present capital.

FROM RURAL EXCHANGES.

Mr. William Walton, who lives not so far from Goddard, states that rural telephones are all right, except the promoters never let up on telephones, telephones and telephones, and pounding some country man to take a telephone or some stock in the telephone and telephone company. He says he doesn't want one anyway for the newly furnished people, especially the boys and girls will telephone a man nearly to death. They will telephone all around the country that Jennie has a beaux or Hezekiah has a new girl, or that Bill is out sparking to-night, or that a baby boy has come to Higgins, or that a wedding is now on top at the house of Muggins, and twixt all they keep a 'till the wee small hours of morning dancing like a ghost about the receiver, until the man who wants a little of aloneness feels like throwing the buzzing thing out into the middle of the road.—*Wichita (Kan.) Commoner.*

If any person thinks that the Northern Rural Telephone Company is a mushroom organization or any sort of a "small potato" institution, he would have had an eye opener had he been privileged to attend the dinner given the subscribers and patrons by the company at Spencer last Friday. While many who would gladly have been there, were prevented by bad roads and other hindrances, still a large proportion of Fostoria was in evidence, together with a liberal, very liberal, sprinkling from other parts of the county, enough probably to aggregate in the neighborhood of 500. Taking it all together, the big annual dinner was a success and afforded fine opportunity for social intercourse to those who did not care to go to the court house and attend the business session. Long live the "hello girl" and the whole "hello" outfit! What would we do if we were denied the opportunity to "rubber."—*Fostoria Flashes in Spencer (Iowa) Reporter.*

A chap has patented a device that will prevent eavesdropping on telephone lines. When one person is talking all other telephones are cut off. He thinks this will be a great thing for the rural lines, but he is off his nut. What is the use of a telephone if you can't hear what is going on over the line, and if you can't use your telephone until there are no other calls on your line you might have to wait all day before you could cut in. This man will not do. He must cut and come again. What is wanted is a device that will enable all who have telephones to hear all that is said all over the country, and every telephone should have a talking machine attached so that a man can hear what is said while he is at work in the field. The Bible says, "He that hath ears, let him hear." If people want to talk secrets over the telephone, why that is just what we want to hear. We are working on a yellograph which will do the work. When it is completed you can attach it to your telephone, and it will yell out all that goes over the line, so that you can sit out in the back yard and make soap and hear all the news in the county as it goes over the wire.—*Benton (Ill.) Standard.*

T. Hallock has purchased the telephone exhange at Hallock, Minnesota.

J. W. Scott has sold the telephone exchange at Drayton, North Dakota, to A. V. Huff.

L. F. Clark and others have incorporated as the Bellingham (Minn.) Telephone Company.

J. H. How has transferred the telephone exchange at Zumbrota, Minnesota, to F. R. Marvin.

W. B. Moore has applied for a franchise to install a telephone system at Yorkville, South Carolina.

Frank Buell has been granted a franchise to operate a telephone system in Wolverine, Michigan.

Harry Williams of Ellsworth, Kansas, has been appointed manager of the exchange at Lyons, Kansas.

R. A. Klinge has been granted a franchise to establish a telephone exchange at Kennewick, Wisconsin.

William Windhurst contemplates constructing a telephone line between Holloway and Morton, Minnesota.

C. H. Munsell of Hiawatha, Missouri, has purchased the telephone plant at Excelsior Springs, same state.

A. B. Crawford, formerly of Elgin, Illinois, has purchased a private telephone line at Nunda in that state.

Messrs. Eby and Smith of Holt are seeking a franchise to install a telephone system in Lathrop, Missouri.

F. B. Rowe of Chamberlain, South Dakota, is seeking a franchise for a local telephone exchange, same state.

J. E. Edwards has been granted a franchise to operate and maintain a telephone system in Forsythe, Montana.

C. E. Wicker has been chosen manager of the Ripley (Ind.) Farmers' Telephone Company for another year.

A. O. Cole of Minnesota Lake, Minnesota, has been appointed manager of the Minnesota Lake Telephone Company.

Orrin Humphries has sold the Marathon (Iowa) Telephone Company's lines to the Northern Telephone Company.

J. I. Golloway has been elected president of the newly organized Fairview Telephone Company of Harper, Kansas.

S. C. Thayer has been elected president of the Beaver County (Pa.) Telephone Company, with headquarters at Beaver.

C. L. Grandin has sold the Mayville, North Dakota, telephone exchange to the Red River Valley Telephone Company.

J. W. Sherrick has sold his interests in the telephone business at Pine City, Minnesota, to R. B., W. R. and H. O. Sherrick.

Albert Thompson of Fullerton, Nebraska, has sold the Citizens' Telephone Company of that place to Theodore C. Koch.

H. D. Critchfield of Chicago, the well-known Independent telephone leader, is recovering from an attack of appendicitis.

E. R. Wynn of Bald Knob, Arkansas, has been granted a franchise to construct a telephone system in Judsonia, Arkansas.

Charles Markel has resigned as manager of the Crestline (Ohio) Local Telephone Company. He is succeeded by William Fidler.

O. G. Nordmarken and others have been granted a local franchise at Granville, North Dakota, for a telephone exchange.

Samuel E. Wayland has resigned as secretary and general manager of the Consolidated Telephone Companies of Pennsylvania.

George R. Tanner has been appointed manager of the Dakota Central Telephone Company's exchange at Madison, South Dakota.

Harry Hart of Gettysburg, Pennsylvania, has been appointed division manager of the United Telephone and Telegraph Company.

W. M. Priest and others have organized the South Creek Telephone Company at Guckeen, Minnesota, and will build a rural line.

C. A. Wood has submitted an offer to the city of Chanute, Kansas, to sell the local telephone plant to the municipality for $60,000.

Harris Walthall and associates have applied to the city council for a franchise to install an automatic telephone system in El Paso, Texas.

James Shambles has purchased the Saffordville, Kansas, telephone exchange of H. H. Hansen and will take personal charge of the business.

Frederic H. Curtiss, for the past year contracting superintendent of the Home Telephone Company of Kansas City, died recently in that city.

C. C. Goodwin, A. H. Goodwin, J. H. Noble and A. S. Dils have been granted a franchise for a telephone system at Jeffersonville, Kentucky.

Charles Kiel, Henry Rohn, Fred Kiel and August Eberhardt have organized an Independent telephone company at Manitowoc, Wisconsin.

J. L. McCutcheon, superintendent of the Nevada Telephone Company, has secured a franchise for a telephone exchange at Fort Scott.

W. A. Hendry and others have bought the stock of the Perry (Fla.) Telephone Company, with the exception of that owned by J. T. Blair.

J. H. Spindler and S. C. Pletcher have purchased an interest in the Lowell (Ind.) Telephone Company and will make extensive improvements.

Manager Pettyjohn of the Dodge City (Kan.) Telephone Company is overhauling the entire system and expects to replace nearly all wires with cables.

W. H. Crumb of Chicago has been granted a franchise for the operation and construction of a telephone and telegraph system at Bozeman, Montana.

A. N. Matheny of Wayne, Nebraska, has been canvassing the field with a view to putting in an Independent telephone system at Oakfield, same state.

L. R. Ames and Frank Simpson have organized a company with sufficient capital subscribed to build a telephone from Wellington to Gardnerville, Nevada.

Harry H. Hipwell of the Hipwell Manufacturing Company of Allegheny, Pennsylvania, has been elected to the Allegheny common council from his ward.

Charles L. Poland, who has been superintendent of construction for the Martin Telephone Company of Webster City, Iowa, for some time, has resigned the position.

B. S. Young of Ada, Ohio, president of the Citizens' Telephone Companies of Texas, contemplates inaugurating extensive improvements in the plant in Beaumont.

F. E. Albright has sold his telephone exchange at Carthage, South Dakota, also the farmers' line west, to the Dakota Central Telephone Company of Aberdeen.

Edwin C. Nutt, Jr., has been elected secretary and treasurer of the Torrey Independent Telephone Company at Penn Yan, New York, to succeed Edward C. Gillett.

John G. Pratt of the Cass County (Ill.) Telephone Company has purchased the exchange of the Bell Company at Virginia, Illinois, and will consolidate the two lines.

J. H. Bales has purchased the system of the Hardin County Telephone Company at Eldora, Iowa. The sale includes the Ackley, Steamboat Rock and Eldora exchanges.

R. H. Porter and E. W. Porter have organized the Potlatch Telephone Company to engage in the telephone business in Juliaetta, Kendrick, Southwick and Leland, Idaho.

Charles Palisch of Frohna, Missouri, has purchased the Perry County Telephone Company's exchange at Perryville, Missouri. Mr. Palisch will rebuild the entire system.

Lewis L. Barnes, chief inspector and wire chief at Columbus, Georgia, has accepted a position with the Georgia Railway and Electric Company in the testing department.

E. E. Newman has been succeeded as manager of the Wood County (Ohio) Telephone Company by H. W. Gillus, who held the position of bookkeeper with the company.

Max Loebell of the engineering staff of Siemens & Halske, Berlin, sailed for Europe the early part of March on the "Blucher," after a visit in this country of several months.

William Roth, vice-president of the firm of Roth Brothers & Company, Chicago, manufacturers of power generators, died at his home, 1002 Trumbull avenue, Chicago, March 10.

I. S. Mahan, general manager of the Lemars (Iowa) Independent Telephone Company, contemplates installing a local exchange in Merrill, with an extensive system of rural lines.

Col. W. D. Rush, manager of the exchange of the Home Telephone Company at Arcanum, Ohio, recently was presented with a handsome easy chair by the employes of the company.

W. G. Olwin, city comptroller, has assumed his duties as manager of the Peoria, Illinois, exchange of the Interstate Telephone Company, which will open for service shortly after April 1.

Linley Yerg of Goshen, New York, has been appointed manager of the Orange County Telephone Company of Middletown, New York, which was recently consolidated with the Hudson River Telephone Company.

H. A. White of the Waverly telephone exchange of Waverly, Kansas, states that the company's new service is working fine. The old exchange was burned out some time ago and new equipment was recently installed.

William C. McGowan, for the past four years district manager

for the C. D. & P. Telephone Company, with headquarters at New Kensington, Pennsylvania, has resigned, and has been succeeded by F. S. Moran, solicitor.

Henry L. Shippy, treasurer of John A. Roebling's Sons Company, has been spending the month of March in Mexico, thus escaping the sharp winds of that period and improving his time by landing several good contracts.

T. J. Buchanan, manager of the Yoakum and Hallettsville, Texas, telephone offices, was recently made manager of the Hallettsville office alone, as the business of both offices has become too excessive for one manager.

F. Mellinger of the Automatic Telephone Company, Chicago, who installed the automatic system for the Citizens' Telephone Company at Battle Creek, has been promoted to the position of traveling inspector for his company.

Col. Frederick S. Dickson, president of the Cuyahoga Telephone Company of Cleveland, has been appointed agent of the trustees who have had the Everett-Moore matters in hand, with authority to settle the few remaining claims.

S. H. Dick is interested in the establishment of a telephone line connetcing Browerville, Eagle Bend, Clarissa and intervening territory, in Minnesota, and also having connection with the long-distance lines traversing this county.

W. A. Jordan, C. T. Lakin and W. W. Terrett have been appointed a committee to consider the question of forming a company at Miles City, Montana, for the construction of a telephone line connecting with Powderville and Ekalaka.

J. H. Davis and Frank Samuels of Boswell, Indiana, have purchased the Fountain Creek telephone exchange, which includes the lines at Rankin, East Lynn and Cissna Park, Illinois. Mr. Davis will go to Rankin to take charge of the business.

George E. Goodhead of Winchester, Indiana, has sold his telephone exchange to a local company. C. W. Banes of Palmyra will be manager of the company and L. M. King assistant manager. The new company will be given possession April 1.

C. A. Walker of Walker, Minnesota, owner of the Brainerd telephone system, contemplates the construction of a telephone line running from Brainerd to Walker, taking in the towns of Pequot, Jenkins, Pine River, Backus, Mildred and Hackensack.

E. N. Reaser, who holds the franchise for the new telephone company at Lawrence, Kansas, has deposited with the city clerk $500, which is the amount required as a guarantee that all streets will be put back into good condition after the work is done.

Harold March, owner of the March Hotel, now in course of construction at Muncie, Indiana, has closed a contract with General Manager Thomas Bromley of the Delaware & Madison Counties Telephone Company, for the installation of 131 telephones in the hotel.

William B. Relth of 747 Herndon street, Chicago, has applied for a patent on an apparatus whereby any number of persons can listen at once to conversation from one telephone. The apparatus is said to be very simple and those who have seen it work praise it highly.

W. F. Goodrich and W. D. Burford of the La Crosse (Wis.) Telephone Company are endeavoring to interest citizens of New Amsterdam and vicinity in the establishment of a telephone system at that place, to be supplied with toll connections with the exchange in La Crosse.

Kanshiro Kawasumi, electrical engineer to the Ministry of Communication, Tokio, Japan, sent by his government to study the telegraph and telephone systems and their workings, in this country, sailed for Japan from San Francisco on the steamer "Siberia" on March 8.

O. A. Beeman, owner of the telephone exchange at Valley City, North Dakota, is negotiating for the sale of the same to Robert Jones of Fargo. The plant includes not only the local exchange, but a large network of wires extending out from that city in all directions.

George Olson and Columbus Cox of Hill City, Kansas, recently installed a telephone exchange at Palco, Kansas. They also completed a line to Callison, nine miles southwest of Palco and are running another line northeast to connect with the Stockton line near Webster.

Ray B. Poole, son of Charles I. Poole, manager of the Utica (N. Y.) Home Telephone Company, has entered the employ of the Stromberg-Carlson Telephone Manufacturing Company at Rochester. Mr. Poole is a Cornell graduate and well fitted to become a valued employe of the company.

F. M. Ferguson of Grinnell, Iowa, agent for the Swedish-American Telephone Company, was in Wymore, Nebraska, recently, and secured an order from the Wymore Independent Telephone Company for its switchboard, telephones and other apparatus for establishing an Independent system.

Charles Wilson, H. C. Cook and A. R. Lawrence of Granger, Texas, have purchased the telephone exchange at Granger from R. H. Bradley of Holland. A new switchboard will be installed and other improvements will be made at once. The company also will put in a number of telephones in the rural districts.

E. P. Platt, local manager at Battle Creek and Marshall for the Michigan Company, and who has been with the company five years, has accepted a road position with the Portland Cement Company. At present G. P. Holland of Detroit, assistant superintendent of the Michigan company, is acting as manager in Mr. Platt's place.

Clark Young, wire chief for the Johnson County Telephone Company of Iowa City, Iowa, had the honor recently to instruct for the Iowa City Academy the class in physical electricity. Mr. Young took the class through the exchange explaining the effects of the various electrical contrivances used in a telephone plant.

Charles E. Guile and A. M. Taylor of Penn Yan, New York, representatives of the Inter-Ocean Telephone and Telegraph Company, are interested in the organization of a new Independent company at Penn Yan, to be known as the Inter-Laken Telephone Company. Construction work will begin as soon as the weather permits.

Vinton A. Sears of Boston, in a recent letter to the daily press, estimates that the reasonably complete development in the United States of telephone equipments will require over 8,000,000 telephones. This is based upon ten per cent of the population becoming subscribers, and is already considered too low for the future by many operating engineers.

John Woodward of London, Kentucky, has organized a company to be known as the Cumberland River Telephone Company, and will begin at once to construct lines from Barbourville, Kentucky, to Keely, Tennessee, via Williamsburg, Kentucky. He will fill the positions of president and general manager, and L. R. Benjamin of Barbourville, secretary and treasurer.

H. L. De Lisle of St. Louis, who has been recently engaged in work connected with the installation of a new switchboard for the Wichita (Kan.) Independent Telephone Company, surprised his friends recently by getting married, the bride being Miss Nora Emmett of Muscatine, Iowa. The happy pair are living at the Gray Gables, while Mr. De Lisle is finishing his work in Wichita.

Lewis L. Wright has sold his rural telephone lines and central station at Pullman, Washington, to a stock company of farmers, of which U. S. G. Story is president and Benjamin Swail secretary and treasurer. It is the intention of the purchasers to consolidate the Wright system with other rural lines owned and controlled by farmers and to make Pullman headquarters for a network of rural lines.

Harry Wilson Webb, who has been vice-president and general manager of the Maryland Telephone Company, has been elected president by its board of directors. He succeeds David E. Evans, who resigned. Mr. Evans was elected vice-president of the company at the same meeting that elected Mr. Webb president, but will have no active duties. He has been in ill health for some time and will now take a rest.

William J. Stuart of Grand Rapids, Michigan, a pioneer in the Independent telephone field, and a prominent lawyer, is making a vigorous campaign for the nomination for Judge of the Superior court of that city. In January, 1895, he obtained from the common council a franchise for an Independent company at Grand Rapids, and in June following organized and procured a charter for the Citizens' Telephone Company, one of the most successful Independent companies in the country. He has been its attorney and one of its directors ever since. Mr. Stuart is greatly interested in the telephone law and investments, has held the office of Mayor two terms, and is a director in the State Bank and the Board of Trade.

Dudley B. Wick, Jr., chief of the engineering department of the North Electric Company of Cleveland, Ohio, died on the morning of March 1. He had been ill for about a week with a severe attack of grip, and this brought about a brain complication, which caused his death. He was a student of the university and high schools of Cleveland, Ohio, and graduated from Cascadilla in 1898. He took special courses, preparatory to his entering upon the profession of electrical engineer, at both the Case School of Applied Science and Cornell University. He became connected with the North Electric Company a few years ago, and speedily rose from a subordinate position to that of chief engineer. This responsible position he filled with great success, and he had won a high place for himself among his business associates.

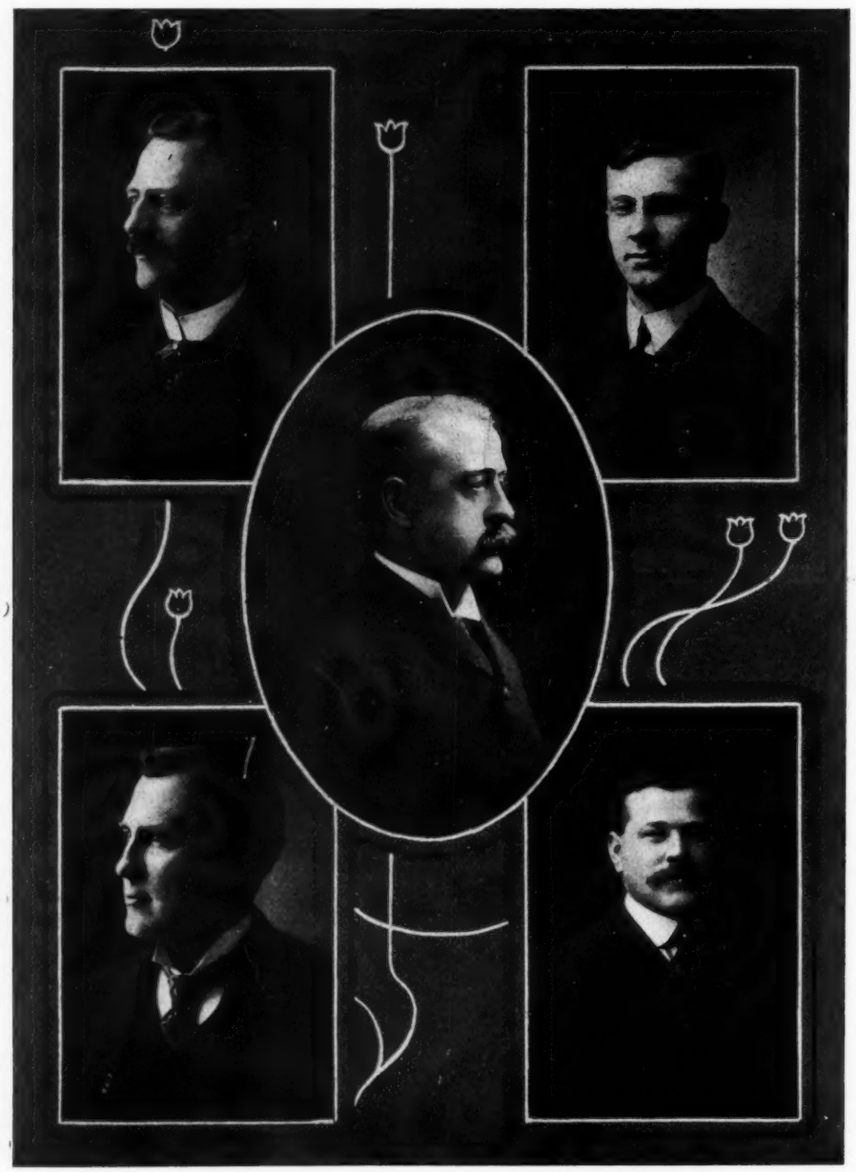
Edwin H. Smythe, who for several years past has had charge of the patent department of the Western Electric Company, has recently become associated with the firm of Rector & Hibben, patent lawyers, in Chicago. Mr. Smythe for the past fourteen years has been engaged in the electrical business, having served in the engineering departments of the Chicago Telephone Company, the Central Union Telephone Company and the Western Electric Company. His active participation in patent work dates back five years, during which time he has had experience in all branches of the business, including invention, the soliciting of patents, litigation and the giving of expert testimony. In connection with his new employment Mr. Smythe expects to take up the study of law. He is a young man of unusual capability, conscientious, energetic, and popular with all who share his acquaintance.

Manufacturers' Department

THE DEAN ELECTRIC COMPANY.

In these days of modern achievements when big things are conceived and produced in record-breaking time, it is almost impossible to create a surprise. In the telephone business this is doubly so. Not long ago, in January, 1904, a new telephone manufacturing concern was brought to light. It was a creation of circumstances, "a natural outgrowth," and from the start included a body of representative telephone men that it would be impossible to get together under any other conditions. Now in a very short period of time this concern has passed through the stages of building its own plant, designing a complete line of telephone equipment, and manufacturing and creating a large market for the latter.

The Dean Electric Company of Elyria, Ohio, has done all of these things and more. It has done them so well that it occupies a superior position, which others in the same line of business have striven for during their entire existence. The story of this company's success contains much of interest. The Dean Electric Company was incorporated in December, 1903, for the purpose of manufacturing telephone apparatus of the highest grade. It is capitalized at $300,000, most of which has now been paid in, thus giving ample funds for operating its factory to the full capacity.



S. B. Rawson, President. W. W. Dean, Vice-President. A. E. Barker, Secretary.
T. M. Brush, Treasurer. T. H. Griswold.

OFFICERS OF THE DEAN ELECTRIC COMPANY.

All of the officers of the company are telephone men of large experience, and all of the stockholders are heavily interested in the Independent telephone business. President S. B. Rawson is well known in the Independent field as president of the American Trading & Construction Company and as an executive officer in more than twenty operating companies. Vice-president and Chief Engineer W. W. Dean needs no introduction, as his twenty-two years of experience in the telephone field has placed him without a peer in his line of work. A. E. Barker, secretary and general manager, is also known for his activity in the telephone business, having, until the organization of the Dean Electric Company, filled the position of sales manager of the Kellogg Switchboard & Supply Company, Chicago. T. M. Brush, prominently connected with the Rawson interests, is the treasurer.

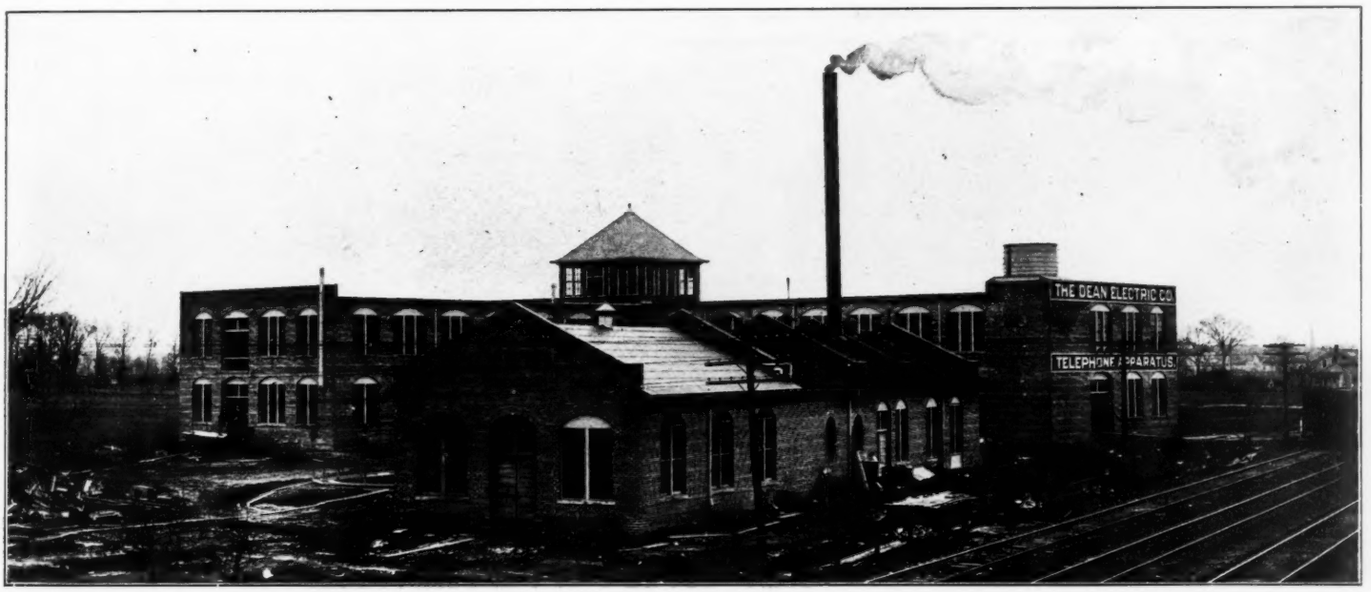
The company's property includes the land on which the factory is located as well as the buildings. The latter have been built especially for telephone apparatus manufacturing so that every foot of the 75,000 square feet of clear floor space is available for actual work. The factory site extends over 1,100 feet along the main line of the Lake Shore & Michigan Southern Railway, thereby giving the best of shipping facilities. Actual work of building the factory was commenced February 16, 1904, and despite the unfavorable winter and spring everything was in readiness on June 1 for occupancy. During this time a temporary office, experimental shop, laboratory and drafting department were engaged in perfecting the proposed new systems and apparatus so that at the time the factory was completed much of this material was ready to be manufactured.

There are two factory buildings, each having high ceilings and many large windows, so that the lighting is ideal throughout. Semi-mill construction is used and fire walls are provided to separate the different sections. Additions are provided for and can be made to advantage, as the entire property has been laid out for a big ultimate growth. The matter of fire protection has been carefully taken care of and is made to conform to the

strictest rules of the fire underwriters. A complete automatic sprinkler system protects every department of the factory buildings, while numerous fire hydrants located on the company's property and fed by eight-inch water mains give ample outside protection. Connection is made with eight-inch city water mains, which normally supply all water for the factory use and fire protection. In addition the company has a 115-horsepower fire pump located in a separate pump house directly in the rear of the main boiler room. This pump is fed from a 150,000-gallon private reservoir and is arranged to be automatically connected to the eight-inch fire mains when started, the city connection at the same time being automatically shut off.

In addition to this elaborate protection fire walls and doors separate each department and the usual water tanks and fire buckets are much in evidence. Two double wall fireproof vaults for the keeping of records and tools complete the outfit. The fire risk must be considered slight; in fact, it is attested to by the exceedingly low rate of insurance required by the fire underwriters.

The power equipment of the Dean Electric Company is unique in that two gas wells located on its property supply the power, heat and light used in its buildings. The main power unit is a 150-horsepower Westinghouse gas engine direct connected to a 220-volt generator. This engine takes gas directly from the private wells or from the city pipes, which serve as an auxiliary source of power. A high speed 100-horsepower steam engine direct connected to a second 220-volt generator serves as a reserve power unit. The latter can be run in multiple with the larger unit, thereby giving 250 horsepower. The steam engine receives power from a boiler which is fed by natural gas or coal. This boiler also serves the heating plant and fire pump, pressure being kept up at all times for the latter. The 220-volt direct current operates individual motors in each department of the factory, as well as the entire lighting. The heating is done by the most modern forced draft system, keeping the fresh air at an even temperature during the coldest of weather.



VIEW OF DEAN ELECTRIC COMPANY'S FACTORY AT ELYRIA, OHIO.

Even to the layman a trip through a telephone factory is full of interest, but to the telephone man, be he wire chief or manager, every detail is full of interest and none too simple to pass observation. The factory of the Dean Electric Company is of especial interest, as it is laid out, from the ground up for the exclusive manufacture of telephone apparatus, and the complete equipment and arrangement of the shop departments are made to facilitate the work. If the reader were to make this tour of inspection possibly the first department to visit would be that of the engineering force, where all of the apparatus is conceived and developed to its highest efficiency. In connection with the engineers' private offices is found an experimental laboratory, model shop and drafting room. The equipment of the model shop includes the best machine tools and bench equipment obtainable, assuring the greatest accuracy in construction. Here the models of all apparatus are built and completely finished in every detail, after which they are carefully tested in the laboratory and in actual operation.

In nearly every case several models are required, each being a development from the preceding, or possibly an entirely new start, before an acceptable result is obtained. For example, in the design of the new Dean four-party line ringer it was desirable to make a piece of apparatus which would be very efficient as far as current consumption was concerned, then the electrical and mechanical design as to harmonic tuning had to be taken care of, and lastly the incorporation of these results into a good commercial form, which was substantial in construction, easy of adjustment and not liable to trouble, and interchangeable with the regular type of ringers. This was a difficult task and required the work of a master hand. As many as a dozen different models were required before the final design was evolved. To the uninitiated the results in this one case indicate a simplified mechanism which we might consider as the finest and most natural design. Simplicity is what the Dean company has worked for in each of its quests for the perfect—a simplified mechanism stripped of all unnecessary parts, but made in the most substantial manner possible. To return to the example of the ringer model, the perfected mechanism must be tried out in practice, and to this end the experimental shop manufactures a number of complete mechanisms by the aid of simple tools so as to make the parts interchangeable. In this case the ringers were put into actual operation on city exchanges and worked under extreme conditions for a sufficient period of time to convince the most skeptical as to their high state of perfection.

The experimental laboratory of the Dean company contains a very complete equipment of electrical measuring instruments, and mounted telephone and switchboard apparatus wired to binding posts, such as relays, keys, condens-

ers, jacks, lamps, talking apparatus, etc. Flexible cords with special tips are used to connect this apparatus in setting up experimental circuits for their final tests. A storage battery located in an adjacent room furnishes testing circuits of any desired voltage, while a special multicycle motor generator supplies the alternating currents of various frequencies necessary for party line and other exchange apparatus experiments. Alternating and direct currents of higher voltage are also available. All of these power circuits being wired to a power board which contains the necessary switches, fuses and meters to control the same. This power board is a product of the Dean shops and is made up of standard parts such as are used in regular common battery exchange power plants. The laboratory is also equipped with sound-proof booths for transmission tests. These booths are connected by a ten-pair cable directly to the exchange of the Elyria Telephone Company, through which any desired combination of long-distance circuits or cable loops can be had. This is a valuable feature of the Dean laboratory, giving, as it does, a chance for a thorough working test of all talking and signaling apparatus under actual conditions. The operating company is thus not required to stand the partial expense and trouble of perfecting its apparatus.

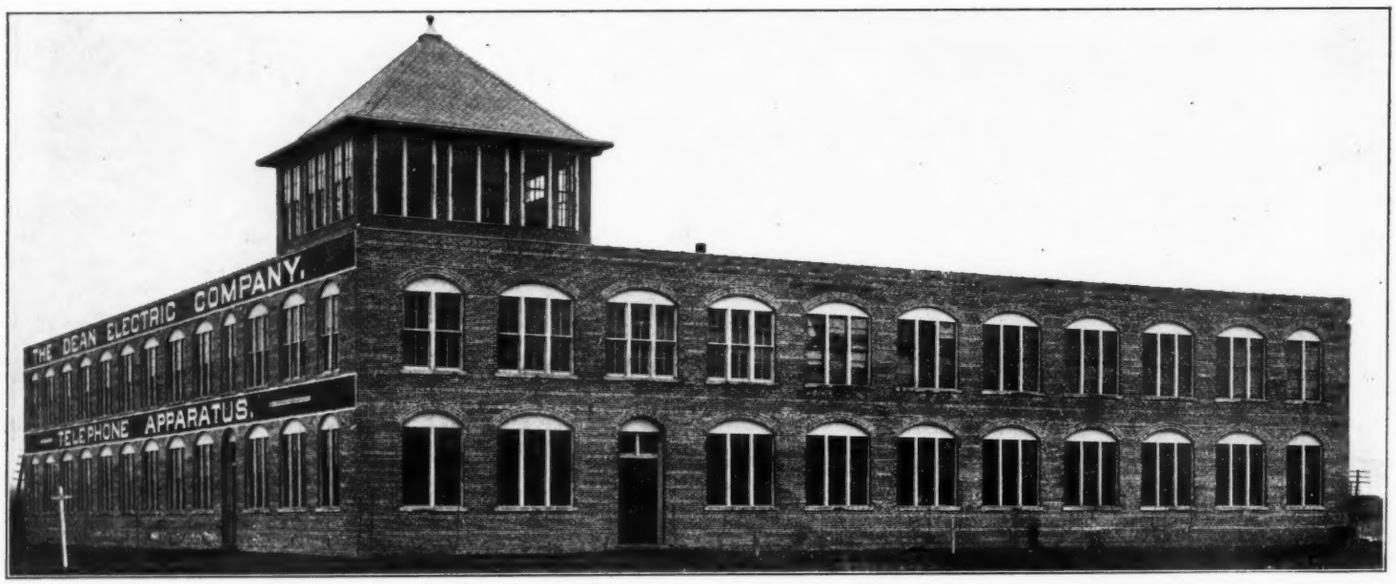
The drafting room is run as part of the Dean engineering department, and here all of the experimental models are drawn up in detail and otherwise perfected for the shop. This work requires extreme care and a complete knowledge of manufacturing, as nothing but blue prints of the designs are allowed in the shop, the models always remaining in the engineering department. It appears at first sight as an unnecessary waste of time to follow such a course, but in modern manufacturing, where all parts should be interchangeable for all future time, it is imperative that complete detailed records are on file, and working drawings are the only recourse. These drawings are subjected to very careful checking before the final O. K. is forthcoming. It might be interesting to note that up to the present time, which includes some strenuous work on the part of the drafting department, there have been no mistakes of any importance pass to the shop. This is an interesting record and shows the extreme care taken by the Dean company in its permanent records—the backbone of any manufacturing concern.

The patent end of the telephone business is run in connection with the engineering department. At the time of organization of the company exhaustive researches were completed on each detail of the proposed new apparatus and circuits before they were put to their final tests. The Dean company has gone to great expense in this work, having retained some of the ablest patent experts in the country, and by their aid all new devices are freed from infringement of other valid patents, thus guaranteeing protection from the start. It is needless to say that the new devices of the Dean company are protected by pending patents, which are taken care of by the same able department.

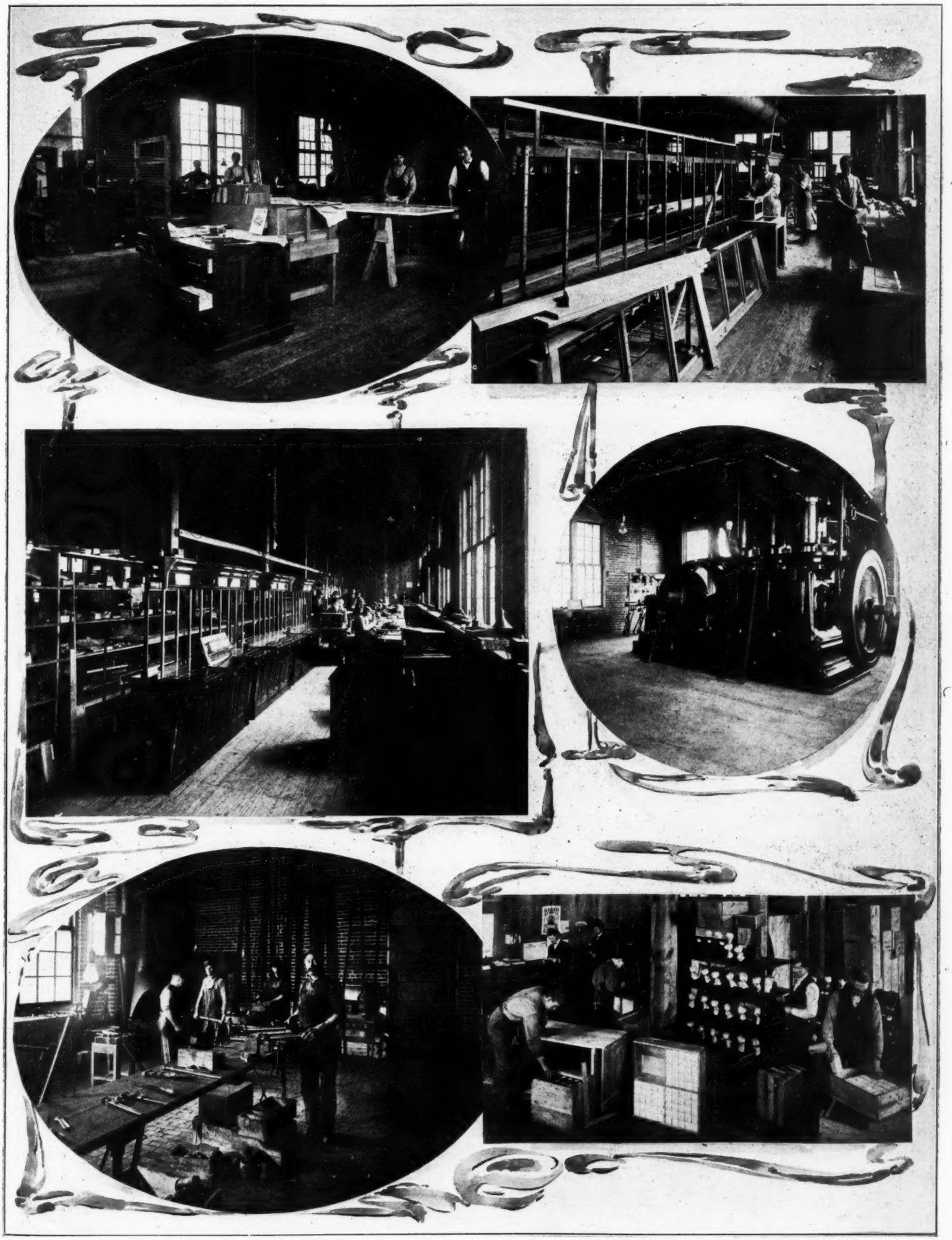
A large fireproof vault in that portion of the building occupied by the engineering department is used for protection of all tracings, blue prints and engineering records. These files represent most valuable insurance to the most valuable assets of the company, as they constitute the work of much time and careful thought in preparation and execution. It would be possible to start a duplicate manufacturing plant and turn out everything that the Dean company has manufactured from these records alone, and within a very short space of time.

The entire manufacturing part of the shop is in charge of a superintendent, who is personally responsible for the output of the factory. At this point the organization of the Dean company forces shows to advantage and the team work of a corps of experienced foremen produce results which would make some of the larger manufacturing companies stagger. In the office of the shop superintendent are kept records which show within a few hours exactly how all material stands, whether raw stock, piece parts or finished apparatus. A definite and accurate promise on shipment of finished material can thus be made at a moment's notice. It is gratifying to note that such a system has been devised so that promises which are so easy to obtain can be kept, with practically no exceptions. The costs of production, shop expenses, etc., are also accurately kept, so that customers can be given full advantage of reduced cost in manufacture.

Passing to the shop, the first department to receive attention is the tool room, where the punching dies, jigs, gauges, etc., are made for the manufacture of each piece of apparatus. Here the expert tool makers work directly from blue prints, and carry their results to fractionals—a thousandth of an inch if called for. The machine equipment of this department is of the best, and is very complete, ac-



VIEW OF DEAN ELECTRIC COMPANY'S FACTORY AT ELYRIA, OHIO.



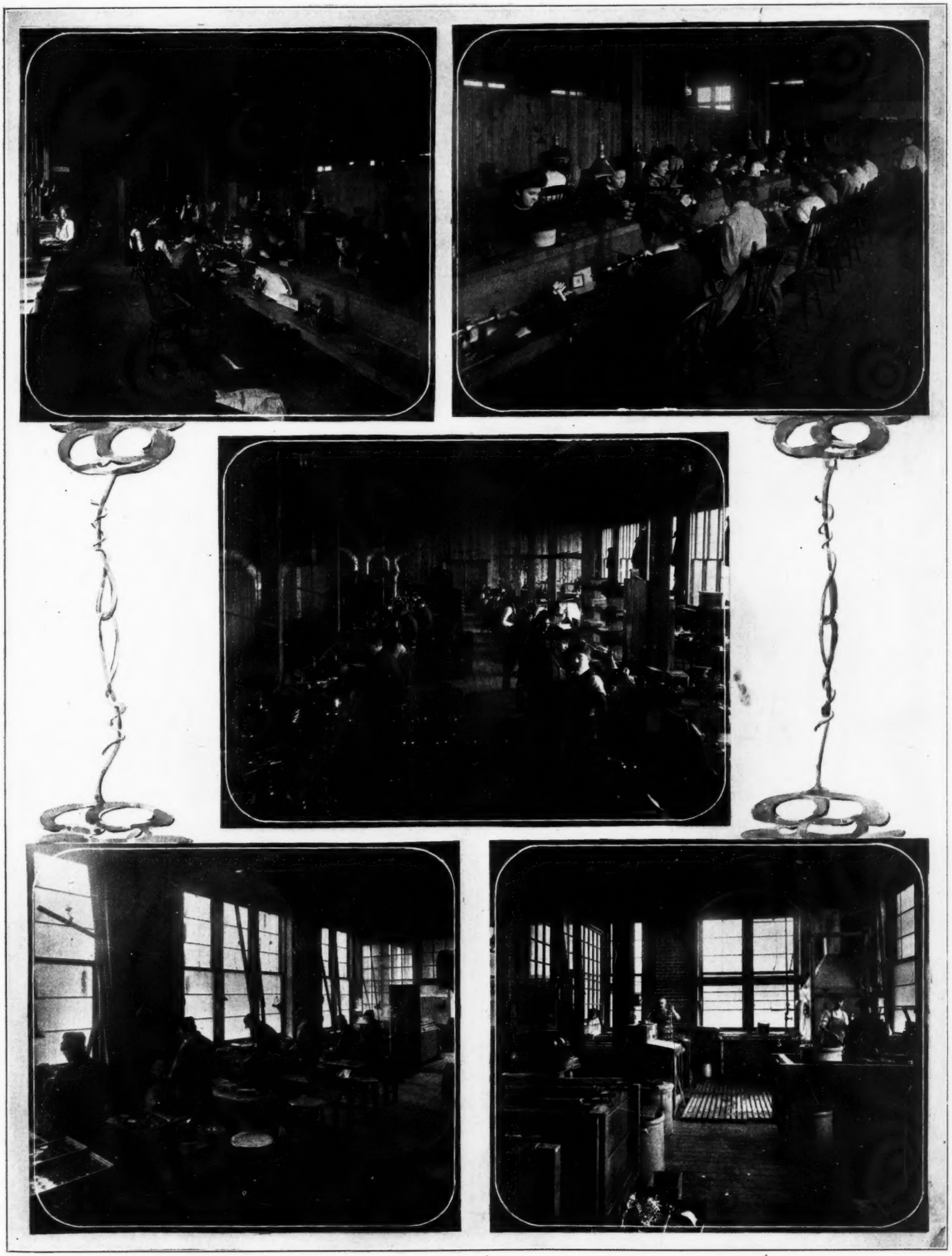
Power Board Department.
Switchboard Department.
Blacksmith Shop.

Cabinet Room.
Engine Room.
Shipping Department.

Automatic Screw Machines.
Punch Press Department.

Tool Room.

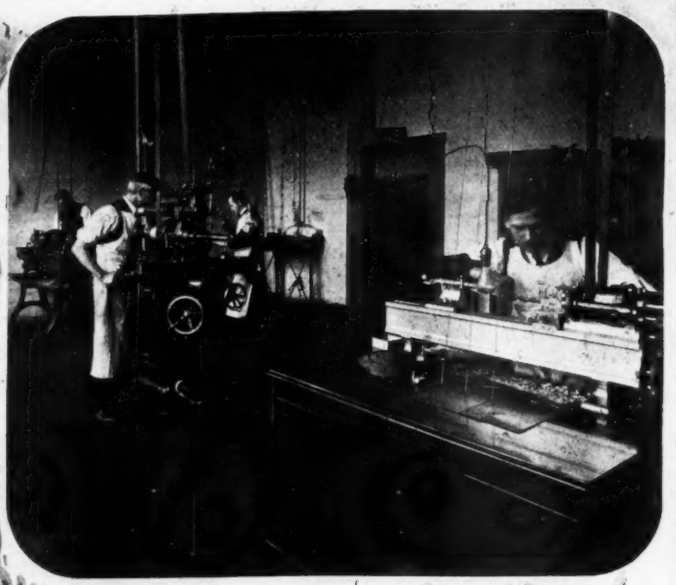
Drill Press Department.
Piece Part Stock Room.

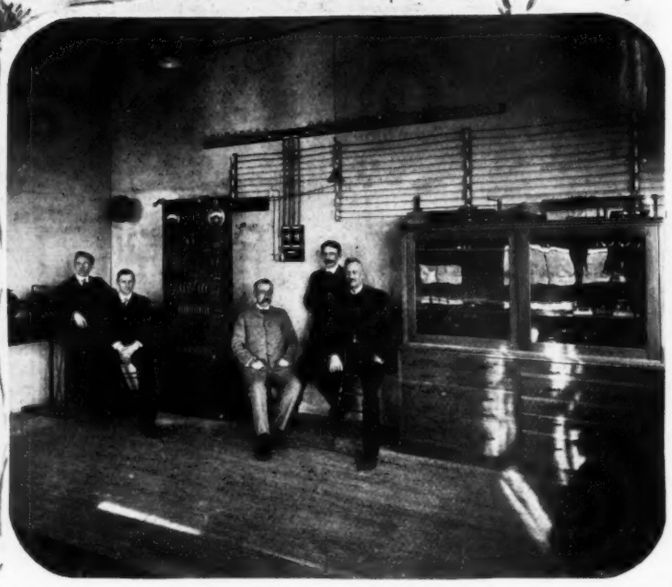


Transmitter Department.
Buffing and Polishing Room.

Telephone Assembling Department.

Winding Room.
Plating Room.





Drafting Room.
Testing Department.

General Offices.

Experimental Shop.
Experimental Laboratory.

commodating as many as twenty-five toolmakers. These men are naturally kept very busy, as each detail of every piece of telephone apparatus requires from one to half a dozen accurate hardened steel tools for their production in order to assure interchangeability. All of these special tools used in the manufacture of Dean apparatus are at all times kept in a fireproof vault for safe-keeping, except when in actual use. This is a most important safeguard, as it insures customers against inability to obtain duplicate orders or parts of equipment which might be destroyed by fire or otherwise.

The shop is divided into manufacturing, assembling and testing departments, each in charge of an expert in the production of telephone apparatus. All of the regular machines used in these departments are the best that money can buy, while in addition many special machines are provided so as to simplify the work and increase the output without detriment to the quality. All of the punch presses, drill presses, milling machines, tapping machines, hand-screw machines and automatic screw machines are grouped in different departments and manned by workmen proficient in the operation of the same. This specialization produces the best of results, especially where all parts are made from working drawings by aid of special tools and gauges.

The polishing, buffing and plating departments finish the various parts in copper, with or without oxide finish, nickel, plain and polished, and gold plate as required.

The piece part stock room receives all finished parts and only deals them out as required by the assembling departments.

In the assembling departments the work is carried along in relays so that each workman is a specialist and becomes very proficient at his vocation. For example, in the construction of telephones the cabinets pass along a bench, each workman doing his part, so that the completed article is forthcoming at the testing end.

The switchboard end of the business is well taken care of, as it is in the best of hands. Not only are the iron frameworks and entire cabinets made in the Dean shops, but every piece of apparatus is produced with Dean tools. Every detail of the switchboard department is arranged to produce the work in the quickest time possible.

The product of the Dean shops includes common battery multiple switchboards, small switchboards, all modern types of central energy and magneto telephones and all parts entering into their construction.

In the testing department every piece of apparatus is carefully tested with actual working conditions before being packed. In fact, the various pieces of apparatus are tested here before being assembled, thus giving several careful tests on most complete pieces of apparatus.

The Dean factory employs 300 men now, but the shops will accommodate 500.

FACTS REGARDING THE RURAL TELEPHONE.

The North Electric Company of Cleveland, Ohio, has issued a pamphlet on the advantages of the rural telephone, which gets right at the meat of the subject and is worthy of the perusal of everybody connected with the telephone business. The "sermon" follows in full:

Six years ago a rural telephone was a luxury—generally speaking, an impossibility—for where branches of great trunk lines were allowed, they were inaccessible save to the rich. *The interest of the agriculturist was not considered. He was not appreciated.* This was a fatal financial blunder by the monopoly of that time. It is to-day possible for every farmer to do for himself what our government has done for Porto Rico and the Philippines—make the whole land a home Remove from farm life its great barrier—isolation from centers of population and business.

If there is no line accessible in your vicinity, be a promoter, take the public-spirited initiative, interest a neighbor in building a line yourselves to connect your homes. Others will see its advantage, join you, and by a natural evolution your service will extend into the nearby towns, and thence to the cities—this has been the universal experience. *You will be out of your isolation into the wide, wide world. Small rural companies are no longer in freeze-out peril.* Their lines are welcomed to the Independent systems of towns and villages; for they are added avenues of trade to their merchant subscribers. It reverts to the good of all.

Knowledge is power. You are hourly in touch with the markets. There will be no more selling of apples at a dollar a barrel to a speculator who sells them twenty-four hours later for three times that amount—the speculator who didn't earn that profit because you produced it. There will be no cattle selling at four and one-half cents that are bringing five in the market town. While the buyer is looking over the herd you are at your telephone verifying his quoted price. *With the rural telephone the speculator is losing advantage, the middleman is losing heart—the consumer is reached direct.*

The secret of right farming is to keep in touch with the consumer, know his wants and the price he will pay. You can make a bargain in the full knowledge of the situation. At the present increase in rural telephone service, the city customer will order direct from the farmer. Why not contribute to this end? Put in a telephone! Then, of course, there are the well-known advantages, as ordering supplies or parts of a broken farm machine from the village; calling the doctor, who, in simple cases, prescribes over the telephone; a burglar, horse thief, fire, peddler, tramp, gold brick and lightning-rod agent alarm. It is only one of the many advantages, *but how much time do you spend going to your postoffice on a doubtful errand for an important letter?. Why not telephone?*

There is its social advantage. The farmer has been the recipient of many labor-saving devices from which his family have had no direct benefits. Community privileges and social groupings are created by the telephone. *The evil and oppression of solitude entailed on woman is eliminated. Many wives and mothers have faded away in the lonesomeness of their toil, far from those in whom they had an interest.* Telephone tea parties are now in vogue on farm lines. There are telephone evening musicales. The accomplished contribute the programme, while others, scattered over an area of many miles, form the audience. The result is more satisfactory than the phonograph. By the way, the telephone is a "circulating library" or medium of exchange for phonograph records.

A news service is one of the innovations of rural telephones, At seven o'clock in the evening a general call is rung. When each subscriber is at his instrument, the exact time is given—for instance: "It is now one minute and a half past seven." There are the weather indications; then the late afternoon national and international news, the extent of which is about that contained in the head lines of the average city newspaper. Following this are the markets—oats, wheat, corn, hay, live stock, butter and eggs. Then the local news, and a portion of the time reserved for questions of detailed news and special market quotations. *McKinley's death was known to farmers ten miles from market towns as soon as in the cities.*

In many cases the equipment now in use is crude and inferior. At its inception the farmers were not ready for the outlay until its business and social advantages were practically demonstrated. Now the additional cost necessary to perfection is but small. The equipment should be equal to the best used in towns. *Good telephones are better than good roads, and poor telephones are worse than bad roads.* The farmer should bear in mind that, although the local advantages are first apparent, the highest value at the farm in a short time will be long-distance service.

With a telephone in the house, a buggy in the barn, a rural mail box at the gate, the problem is solved—

How to keep the girls and boys on the farm.

The following dedication and marginal paragraph appear in the pamphlet:

To the American farmer, the real producer of his country's wealth; whose isolation has heretofore deprived him of his full measure of reward; who is now in a new era of civilization through an easy mode of communication, which has brought the Voice of Progress within hearing of every rural home:

You usually choose the shortest way to town. Possibly there is another still shorter—the telephone.

There are three things that make a nation great and prosperous: Fertile fields, busy workshops and easy means of communication from place to place.

Of all inventions of modern times, the alphabet and printing press alone excepted, those inventions that abridge distance have done most for civilization.

Don't say: "I can't afford a telephone just now;" to have one is the way to a condition where you can afford it.

A poor horse costs more to keep than a good one. He eats as much and often gets sick. A good telephone costs little or nothing to keep and never gets sick.

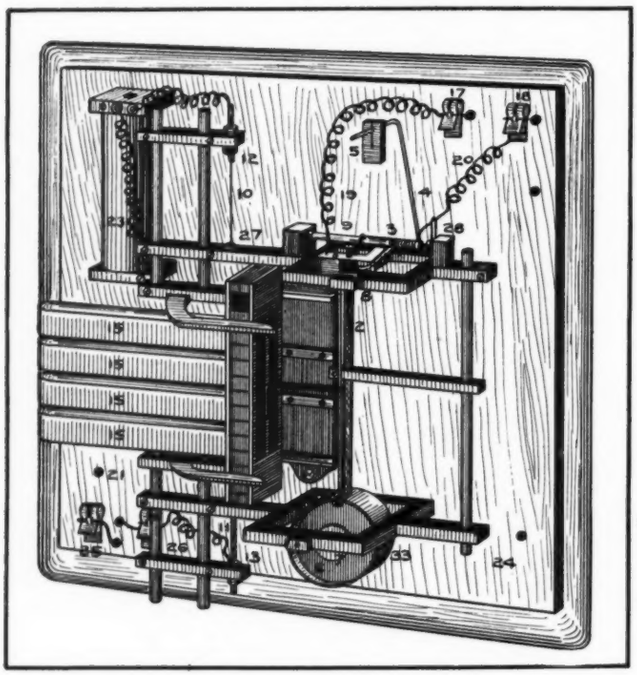
There are five and one-half million telephones in use in the United States. Four million are Independents and one million and a half are Bell. Bell has been in business twenty-nine years and

the Independents seven years. Did you see telephones in farm houses seven years ago?

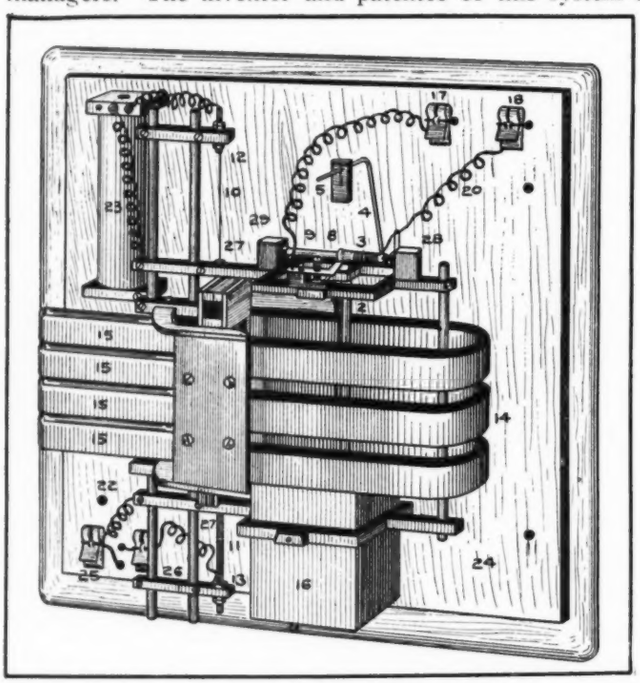
For a hurry-up trip take the surest horse in the barn—one that doesn't balk. The poorest telephone costs $2 less than the best. The one that doesn't balk—a "North."

T. AND A. SELECTIVE CENTRAL CALL SYSTEM.

The T. and A. selective central call system, manufactured by the T. and A. Selective Call Company of Geneseo, Illinois, has taken a prominent place in its particular field and is attracting considerable attention from telephone exchange managers. The inventor and patentee of this system and apparatus, early in the Independent telephone movement, recognized that there were some very serious disadvantages in a party line, not a few of which, it seemed, might be obviated. Study of the situation led to an earnest effort to secure for the central operator escape from the intolerable nuisance of drops falling or bells ringing at every party ring "out on the line," and therefore an abatement of the necessity of the operator listening and ascertaining, *at once*, if, among a mass of useless signals at "Central" there should be *one* for that particular "Central."



SELECTIVE CENTRAL RELAY.



SELECTIVE CENTRAL RELAY ON WALL.

What was desired was a drop that had the *peculiar property* of *not* ringing down when one party station called another party station, but this drop must of necessity be highly sensitive to a ring from any station when "Central" *is* wanted. To meet these conditions it was apparently necessary to ring the party stations with alternating current. After much study and experimenting a selective central relay was produced that is non-responsive to the regular alternating ringing current, usually used for calling—non-responsive in that the drop on the switchboard is not thrown by party calls using alternating current for calling, the selective central relay promptly responding to either, positive or negative, pulsating or continuous current, the control of whichever current that shall operate the relay being secured by the way the wires connecting with the line wires are led into the relay.

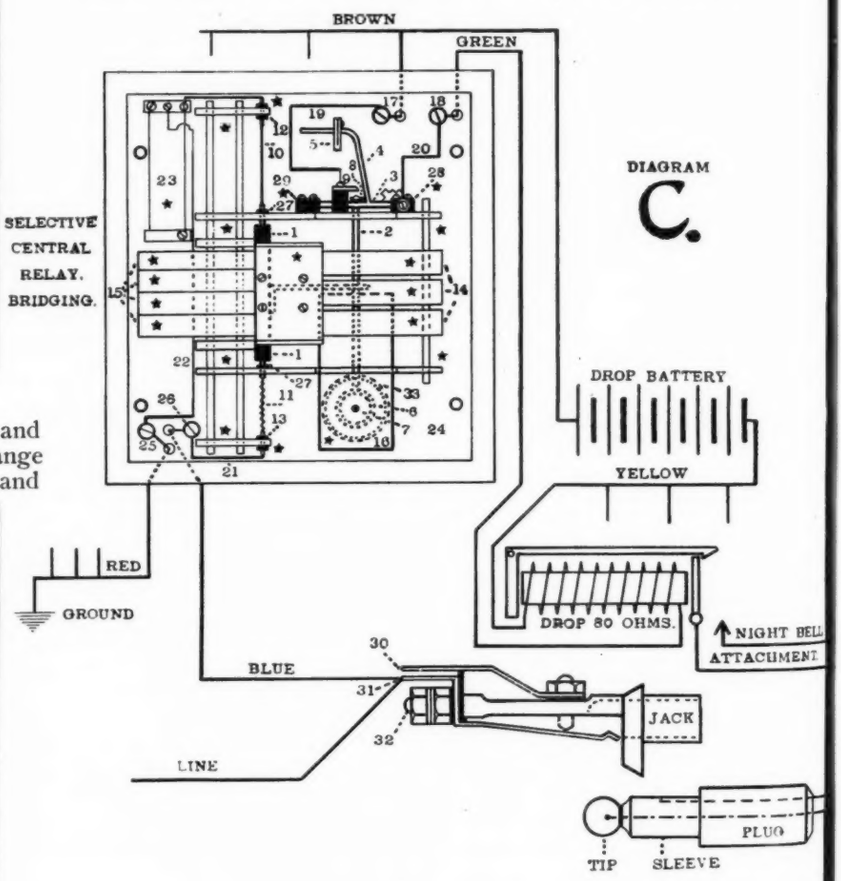


DIAGRAM SHOWING OPERATION OF RELAY.

When a party station calls another party station, alternating current being used, all party station bells are rung. The drop at central, however, is *not* thrown and the operator is *not* disturbed. When *any* party station desires central a push button (the negative or positive one, as the case may be) is firmly pressed and the generator crank revolved four to six turns, made permanent, because of the reliability of the force of gravitation.

For the purposes of adjustment of the weight of the parts the weight 5 is used. Coil *1* hangs in an intense magnetic field, produced by large magnets *14*, and small magnets *15*.

Coil *1*, with arm, wire *10* and spring *11* are all secured together. Dash pot piston *6*, rod *2*, rocker shaft *3*, weight rail *4* and contact *8* are all secured together; the fan *6* carries a loose valve *7*. There are but three moving parts to the relay, though the different portions have many numbers.

The T. & A. company will promptly answer all correspondence relating to this relay, and will be pleased to send to anyone requesting it, literature more fully explaining its working, including prices, etc.

ADJUSTAPHONE IS POPULAR.

The Chicago Writing Machine Company made an exhibit of Adjustaphones at the Office Appliance and Business System Show, held recently in the Coliseum in Chicago, and "System," the daily paper of the show, in referring to the Adjustaphone and the novel use to which it was put said:

"Through a combination of two of the world's most famous inventions, the telephone and the Columbia phonograph, a band selection has been recorded and can be heard at will through the Adjustaphone at any of the booths that have these instruments in use. For the first time it is now possible to dictate letters over the telephone by using a phonograph. The extreme sensitiveness of the tone-reproducing mechanism of the Adjustaphone is admirably illustrated in this way, as the harmonious tones lose none of their sweetness and clearness, even though they were first transmitted to the phonograph through the Adjustaphone and are then returned through it to the audience. The Chicago Writing Machine Company is to be congratulated on producing an apparatus that not only saves the busy man's time in using the telephone, but enables him to hear and be heard more distinctly than in the older types of telephone apparatus."

DESCRIBES A GREAT INDUSTRY.

A recent issue of the Rochester (N. Y.) Post-Express had the following to say regarding the Stromberg-Carlson Telephone Manufacturing Company of that city:

One of the most important additions to the manufacturing industries of New York state during the last two years is the establishment of the Stromberg-Carlson Telephone Manufacturing company. Some two years ago this company located a small factory in the eastern part of this city, close by the Central railroad, where it began the manufacture of lead-covered cable for aerial and underground use, switchboard cable, flexible cords and magnet wire used in the Chicago factory.

Since this factory was opened the company has been so favorably impressed with the location, facilities for shipping and general accessibility to the large markets of the United States and the demand for the apparatus has been so great that recently it was decided to increase the Rochester factory to a sufficient degree to look after the entire manufacturing at this point. This matter of moving was a large proposition, as the Chicago factory was extensive, employing about 1,500 people, and was taxed to its utmost with orders. All this must not interfere with the filling of orders promptly nor delay the work in any department. Finally the work has been accomplished and the factory in Rochester as it now stands is the most complete and the largest Independent telephone manufacturing establishment in the world.

The several buildings cover seven and one-half acres of ground, and the company owns a large tract to allow for growth. The buildings are models of what a factory building should be. They are one story in height, except the office building, power plant and foundry, with roof of the saw-tooth type, thus admitting daylight throughout all departments. The factory fronts on University avenue, which has one of the best car lines in the city, and special cars are run during certain hours of the day for the benefit of the employes.

The matter of obtaining a sufficient number of skilled employes has been quite a task and one which will naturally take some time to accomplish, there being much skilled work in a plant of this kind. More than 2,000 people are employed at present, but many more are needed to carry on the work of such an extensive establishment. There are still many excellent opportunities for those seeking employment, as the company is taking on more men daily in the following departments: Cabinet, plating, polishing, molding, punch-press, screw machine, draughting, japanning, milling, machine, shipping; also tool, die and pattern makers, telephone apparatus assemblers, and switchboard wire men. In fact, new men are being hired daily in practically every department in the establishment. It is the aim of the company to employ double the number of men in all its departments.

AUTOMATIC TELEPHONES FOR SOUTH BEND.

The South Bend (Ind.) Tribune of March 14 says: "A contract was to-day made by President Theodore Thorward for the South Bend Home Telephone Company with A. J. Rousseau, representing the Automatic Electric Company of Chicago, for a switchboard of automatic telephones to be used in connection with the local exchange. This was made necessary by the fact that the present equipment had become insufficient for the demands of the public, and it was impossible to install telephones with new subscribers.

"In adding additional telephone facilities, it became a question whether to continue the present method of operating telephones by exchange girls or to adopt a more modern method by installing the improved modern system of automatic telephones. The company having in mind the constant improving of its plant, decided upon adopting the automatic system, and as a result 500 of these telephones will be installed in the city at an early date. The new system will work with the old manual system and users of the automatic telephone can call any subscriber in the city without the use of the central exchange."

ORDER COOK PROTECTOR EQUIPMENT.

Frank B. Cook of Chicago has received a number of orders recently for complete protector equipment, both inside and out, for several exchanges. Among these are the Red Wing (Minn.) Telephone Company, 900 pairs No. 8 protectors for switchboard protection, and 35 type S. M. cable terminals for outside protection; Seward (Neb.) Telephone Company, 200 pairs No. 8 protectors and 18 pole cable terminals, type S. W.; Williamsport (Ind.) Telephone Company, 520 pairs No. 8 protectors and 20 type S. W. pole cable terminals. He also received an order from the Fairbury (Neb.) Telephone Company for 20 type S. W. terminals, for outside protection. The inside, or switchboard, protection is Cook's No. 8.

In addition to these orders, Mr. Cook recently has had the following orders for his No. 8 protector: Morrow County Telephone Company, Mt. Gilead, Ohio, 370 pairs; New Brunswick Telephone Company, St. Stephens, N. B., 210 pairs; Twin City Telephone Company, St. Paul, Minnesota, 680 pairs; Commercial Telephone Company, Warsaw, Indiana, 600 pairs; Commanding Officer, Frankford Arsenal, Bridesburg, Pa., 50 pairs; Johnson County Telephone Company, Iowa City, Iowa, 25 pairs; Arlington Local Telephone Company, Arlington, South Dakota, 100 pairs; Canadian Machine Telephone Company, Toronto, Canada, 500 pairs; Eastern Telephone Manufacturing Company, West Chester, Pennsylvania, 140 pairs; York Tele-

phone Company, York, Pennsylvania, 120 pairs; Scott County Telephone Company, Winchester, Illinois, 240 pairs.

EQUIPMENT FOR PETERSBURG EXCHANGE.

George H. Glass of Petersburg, Illinois, was a recent visitor in Chicago. Mr. Glass, who is president of the Central Illinois Telephone Association, is largely interested in the new Independent telephone exchange that is now being built at Petersburg. While in Chicago Mr. Glass placed an order with the Swedish-American Telephone Company for a 500-line central office equipment and 500 telephones. The above mentioned exchange when completed will be strictly modern and A. No. 1 in every particular. The people of Petersburg are to be congratulated upon securing the services of Mr. Glass as president and general manager of their new company, and with the equipment which has been selected they are assured of an up-to-the-minute plant and excellent service.

FILLS AN IMPORTANT POSITION.

M. A. Gurney, superintendent of salesmen with the Chicago Telephone Supply Company of Elkhart, Ind., is an Iowa product, having been raised at Sheldon, Iowa. He entered the telephone field in 1897 with the Home Telephone Company of Sioux City, Iowa, in the employ of which concern he made an enviable record, gaining a fund of practical knowledge which has since proven of inestimable value to him. From there he became connected with the Triumph Electric Company, at their St. Paul office, adding still further to his knowledge along telephonic lines. He was next associated with the Chicago Bell Telephone Company, where he remained for a number of years. Mr. Gurney has a wide acquaintance in the central and western states, where he has traveled extensively, and his knowledge of the particular needs of those sections of the country is greatly aiding him in his present position. He is energetic, resourceful and convincing, and these characteristics are just what are needed in a man engaged in his line of work, and account in a large measure for Mr. Gurney's success.

M. A. GURNEY.

"AMERICAN" TELEPHONE INSTALLATIONS.

During the past two months the American Electric Telephone Company of Chicago has furnished increased switchboard capacity for the Independent exchange at Topeka, Kansas. This fetches the total of subscribers' lines in the Topeka exchange up to something over 2,500. Everyone familiar with the rapid increase made by the Topeka company admits that the growth of this company has been very remarkable, considering that the original installation of the exchange was for only 600 lines and was installed during the year 1902.

The Independent Telephone Company of Topeka, Kansas, recently ordered an additional equipment of private branch exchange switchboards. The Topeka company has secured the contracts for equipping most all of the hotels in that city with this class of service. The American Electric Telephone Company furnished all of the apparatus needed for the hotel equipment, including switchboard and telephones. The Topeka company also has recently ordered a 1,200-line magneto call switchboard system from the American company. The equipment consists of two sections, oak cabinets. Each position of this switchboard is fully equipped and arranged for giving service to 200 subscribers' lines. It is made possible to operate so many lines from one operator's position through an efficient training of the operators, and also owing to the equipment provided for handling the entire service throughout the board, the American company's flashlight transfer system having been adopted.

The Independent telephone exchange at Hot Springs, Arkansas, has recently had installed by the American company an increase in its switchboard capacity to a total of 1,320 line terminals, this increase being brought up from 1,000 lines. Since the above installation this same company has received an additional order for 180 lines, which presents a remarkable increase in the prosperity of the company.

For some time past we have presented notices from the American company in which it stated that it had equipped many of our War Department divisions with switchboard and telephone equipment. A recent shipment to Washington included two 50-line local battery switchboards.

BISSELL COMPANY'S NEW TRADE MARK.

A new trademark which has been adopted by the F. Bissell Company of Toledo, Ohio, may be taken as a symbol of their own activity in pushing the Security specialties and Novelty pot-heads and sleeves which they manufacture, or of their long jumps in the electrical jobbing trade, where they are very prominent, or it may be a tribute to their home city, Toledo, where frogs were once famous and now are only memories; but, whatever the motive, it is widely and favorably known as a guarantee of full value. "You can't tell by looking at a frog how far he can jump," (revised version), but this one will go with the best of them.

A NEW COIN COLLECTOR.

A large and prominent manufacturing company located in the middle west is about to place on the market a Coin Collector, which has some entirely new and novel features. We learn that P. J. Hertz, who has been identified with the telephone business since the early days of the Independents, will have full charge of this department for the company manufacturing this new collector.

This notice was received by us just before going to press, and therefore we are unable in this issue to give the necessary space for a full and complete description. All inquiries may be addressed to P. J. Hertz, 88 La Salle street, Chicago, who will be pleased to answer same with additional details.

"THE SPIRIT OF THE TELEPHONE."

One of the handsomest and most artistic calendars of the year is that issued by the Controller Company of America. It is called "The Spirit of the Telephone," and an allegorical representation on the front fully and beautifully bears out the title of this work of art. The "spirit" is in the form of a glorious woman clad in diaphanous raiment and rising wraithlike above a sleeping city, along the outskirts of which, in the foreground, runs a telephone line. The spirit-maiden holds aloft in one hand a receiver, and with the other hand presses another receiver to her ear. The whole effect is startling and original. The Controller company describes the picture in the following language:

"The Spirit of the Telephone," flashing hither and thither in her new found freedom, weaves her gossamer web of copper and heralds the message—"A telephone in every home." For three decades she has remained shackled and starved in the dungeons of greed, while an unwilling few paid tribute to monopoly. A great invention had

failed in its mission. No longer the luxury of the few but the comfort and protection of every home, "The Spirit of the Telephone" offers you the magic wand that blots out time and space.

"Measured Service," that matchless knight, the leader of the army of "Independent telephony," has stricken away the last manacle and opened the prison gates. At last the telephone will fulfill its destiny and bring cheer to every fireside, urban or rural. "Telephones for the Masses," "Living Profits for the Telephone Company" and "The Deadhead Pays His Way" are the mottoes of this new leader.

The calendar picture was designed by Frank F. Sapp of the Controller company, the drawing being made under his direction by R. W. Hirchert, a well-known Cleveland artist. The Controller company also has furnished these calendars to the Sandusky (Ohio) Telephone Company for distribution to its customers. The "Spirit of the Telephone" is suitable for framing, and a copy for this purpose will be sent for 10 cents (cost of mailing) upon application to the Controller Company of America, Chicago or St. Louis.

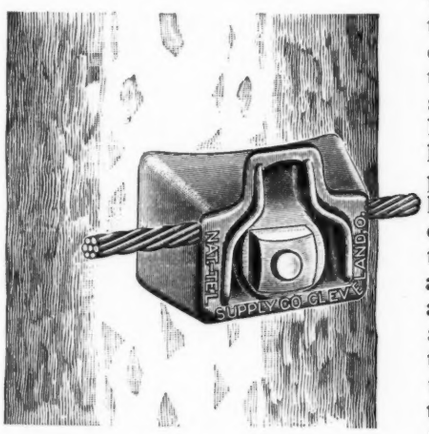
ELECTRICIAN'S POCKET TOOL KIT.

The Manhattan Electrical Supply Company of Chicago and New York is manufacturing an electrician's pocket tool kit, which is indispensable to the practical electrician. The case is made of the best quality of russet leather, hand-stitched. It is of convenient pocket-book style, firm metallic clasp, and measures 3x6 inches. It contains the following tools, viz.: One electrician's knife, one oil can, one pair nickel-plated six-inch pliers, one file, one pair tweezers, one pair electrician's shears, and one screwdriver.

Catalogue and price list will be sent upon application, and correspondence is solicited, as the Manhattan company manufactures many other articles that every electrician and telephone man should possess.

NON-BREAKABLE MESSENGER HANGER.

The National Telephone Supply Company, Cleveland, Ohio, reports that the non-breakable messenger hanger which it manufactures is finding increased favor among telephone buyers, the sales of this hanger last year being so large that the company had difficulty in keeping up with orders. This hanger, as the name signifies, is absolutely non-breakable, thus overcoming all accidents and trouble. It is put on the pole with a through bolt, which fastens it perfectly secure, and makes it the best hanger on the market for heavy cable work, it is claimed by this company. The Illinois Electric Company of Chicago is in position to quote on these hangers and make prompt shipments to the western trade.



The People's Telephone Company of Superior, Wisconsin, is to extend its underground system, and to repair and replace such parts of its system as may require it.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, New York, is sending out a novel series of "yaller" and red mailing cards advertising its line of goods.

THE TELEPHONE COMPANY, Warrensburg, Illinois, has been organized for the manufacture of electrical apparatus and supplies. George W. Claussen, Joseph A. Suerth and J. H. Rumsfeld are the incorporators.

THE NATIONAL CABLE AND WIRE COMPANY'S general offices have been removed to its manufacturing plant, Shousetown, Pennsylvania, which point will in the future be its mailing, telegraphic and shipping address.

M. KLEIN & SONS, Chicago, already are beginning to experience the resumption of activity in the telephone field, and orders and inquiries are coming in at a rate which indicates that this will be a very prosperous year.

THE MILWAUKEE TELEPHONE COMPANY, Milwaukee, Wisconsin, has issued a neat booklet descriptive of its intercommunicating and exchange telephones. A copy of same will be sent free to all interested parties on request.

SAMUEL HARRIS & COMPANY, 23 South Clinton street, Chicago, handle a large line of tools and supplies suitable for telephone constructional work. They will be pleased to submit catalogue and prices to all who may be interested.

THE NATIONAL BATTERY COMPANY, Buffalo, New York, is mailing to the trade a neat illustrated folding circular, advertising its "Unit Accumulator" for telephone central energy branch stations. Further particulars and prices upon application.

THE AMERICAN STEEL AND WIRE COMPANY made the one-inch diameter crucible steel hoisting rope recently put in the elevators of the Washington monument at Washington, D. C. These ropes were made according to government specifications.

T. J. GALLOWAY & COMPANY, Johnson City, Tennessee, who for the past eight years have been prominent in the manufacture of insulator pins and brackets, are erecting a large, new establishment at Johnson City, and will greatly increase their facilities.

THE INTER-OCEAN TELEPHONE AND TELEGRAPH COMPANY, Buffalo, New York, is sending out a mailing card on which are shown its toll lines in western New York—an extensive system, and one which is being steadily enlarged. It already serves 75,000 subscribers in western New York alone.

THE STURGES & BURN MANUFACTURING COMPANY, Chicago, is enjoying a fine trade among manufacturers and supply men on its relay shells, telephone arms and call box covers. This company is prepared to make to order any other telephone specialties in which drawn metal work is required.

"THE SAME OLD THINGS" is the title of a neat little booklet being distributed by the American Electric Fuse Company, Chicago. It relates to "American" self-soldering

protectors, and contains many illustrations of these and other supplies along the same line. The booklet will be sent upon application.

THE LORIMER AUTOMATIC TELEPHONE COMPANY was recently organized at Augusta, Maine, for the purpose of dealing in apparatus and property pertaining to the complete operation of telephone lines or systems. Its capital stock is $10,000,000. The officers are: President, G. R. Hadlock; treasurer, E. F. Whittum, both of Augusta.

THE MILLER ANCHOR COMPANY, Norwalk, Ohio, reports a big sale of anchors to the Cumberland Telephone Company of Nashville, Tennessee; also to Porter & Berg, Chicago. A large order is going to the New York & New Jersey Telephone Company, while a lot of big anchors are going to Cuba for the government wireless telegraph stations.

THE WESCO SUPPLY COMPANY, St. Louis, has just issued a neat booklet, the title of which is, "Use Your Think Tank." It deals with features of the Wesco telephones, and contains "a few facts briefly stated that will appeal to every thinking telephone buyer." A copy will be sent to anyone applying for same.

W. N. MATTHEWS & BROTHER, Carleton Building, St. Louis, have just issued a new thirty-two-page catalogue, devoted entirely to the Stombaugh guy anchor, which, it is said, is the most attractive piece of literature that this enterprising firm has ever sent out, and which will be sent upon request. It should prove of great interest to those who have poles to anchor.

THE CHICAGO SOLDER COMPANY, 44-56 Union street, Chicago, is the new name for the Kester Electric Manufacturing Company. The change is one of name only. The new company says no exchange of stock has been made, and that the same officers have the same desire to serve their patrons faithfully. It is responsible for the obligations of the Kester Electric Manufacturing Company.

THE HARVARD ELECTRIC COMPANY, 60 West Van Buren street, Chicago, is distributing several illustrated catalogues and price lists. The company is the manufacturer of fuses, cutouts, distributing boards, terminals, heat coils, cable hangers, magnet winders, connectors, paper sleeves and other electrical specialties. This material is listed in these catalogues, which will be sent upon request.

THE JONES PERPETUAL LEDGER COMPANY, 14 Michigan street, Chicago, is advertising its line of loose-leaf record books to the telephone trade. Every telephone exchange in the country, which believes in keeping its records in up-to-date and convenient form, should be interested in a proposition of this kind, and they are invited to write the Jones company for descriptive matter and prices.

THE AMERICAN CONDUIT MANUFACTURING COMPANY is making extensive additions to its plant in New Kensington, Pennsylvania. When these are completed its manufacturing facilities will be increased 100 per cent. The sale of American steel conduit has steadily increased until the remodeling of the plant has become an absolute necessity. The offices of the company are located at 524 Fourth Avenue, Pittsburg.

THE L. B. ALLEN COMPANY, INCORPORATED, 1335 Columbia avenue, Chicago, is calling attention to its soldering compounds and specialties in a unique manner, mailing a heavy tag to its patrons which bears on the reverse side nine statements addressed to the electrical field. The card calls attention to the Allen soldering stick, soldering salts, fluxes, commutator lubricant, metal polish and self-fluxing solder.

D. BAUMFLEK AND M. FELSENTHAL, Chicago, have formed a partnership and will do a general business as telephone contractors. They will make line construction work a specialty, but will be prepared at all times to figure on telephone and electrical installations, large and small. They are prepared to furnish references as to their reliability, etc., and invite correspondence. Address, 3737 Vincennes avenue, Chicago.

THE GLOBE AUTOMATIC TELEPHONE COMPANY, Chicago, has in preparation some important announcements, which will be made in the May TELEPHONY. These will be of more than ordinary moment and telephone managers are requested to read the announcements carefully. It will also print detailed descriptions of its complete automatic apparatus as embodied in the Lundquist trunking system, which has created so much interest in telephonic circles.

THE AMERICAN VITRIFIED CONDUIT COMPANY, Broadway-Maiden Lane Building, New York city, has issued a booklet entitled, "Pointers," for giving such information as may be required for preliminary estimates in laying out plans for conduit work. In the New York Rapid Transit Subway there have been used 7,000,000 feet of a special type of round-hole conduit, constituting one of the largest and most interesting pieces of construction ever attempted.

GEORGE H. BUCKMINSTER & CO., 155 Milk St., Boston, is the name of a new firm which has recently entered the supply field. The members of the firm, George H. Buckminster and Charles F. White, have had a number of years' experience with the firm of Pettingill-Andrews Company, of Boston, and possess a full knowledge of all the details of the supply business. The new company is making a special bid for the business of telephone companies and invites correspondence.

SINCE the Standard Telephone Manufacturing Company, Milwaukee, has improved so materially upon its switchboard and in arranging the drops so that they can be removed from the rear of the switchboard without interfering with the face of the board, their switchboard department has been kept exceedingly busy. This improvement has been made during the last two months. Anyone desiring detailed information will be gladly given it by application to the company at Milwaukee.

AN illustrated booklet relating to white cedar poles is being distributed by the Valentine-Clark Company of Chicago. Beside several unique pictures, showing scenes in the company's different yards, it contains much valuable information upon the pole industry in general that should prove of interest to those engaged in telephone work. A table of seasoned weights is printed, as well as the Northwestern Cedarmen's Association's standard specification pertaining to white cedar poles. A request will bring this booklet by mail.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, New York, has placed on the market a four-party selective system for both common battery and local battery service. The Century company claims for this system points of advantage in the way of simplicity and efficiency and will be pleased to give to inquiries complete details in regard to this apparatus. The Century company has just closed a contract for the full multiple common battery equipment for the Princeton (Ind.) Telephone Company. The board will be installed in the early spring. This com-

pany also reports a large and increasing demand for its automatic signaling magneto telephones and for its new Century outside cable heads. It reports having closed several large contracts for this apparatus recently. Detailed information in regard to the above will be furnished on application.

THE EWING-MERKLE ELECTRIC COMPANY, St. Louis, has just issued a booklet for distribution among the small users of telephone equipment, entitled, "A Little More Light." It treats mainly of the construction of telephone lines in rural districts. It also contains valuable information along the line of promotion and organization, and altogether is a profitable little work, which may be perused to good advantage by all those interested in telephone work. A request for one of these booklets will bring the same promptly by mail.

THE LAMBERT SCHMIDT TELEPHONE MANUFACTURING COMPANY, Weehawken, New Jersey, has recently secured a large order from the war department of the United States government, the material contracted for including the following: Two hundred wall sets, 75 emplacement sets, 50 portable sets, 50 desk sets, 100 head sets, 100 hand sets, 200 breast sets, 200 single head receivers, 50 hand set switches, 50 cords for single head receivers, 50 cords for head sets, 50 cords for breast sets, 25 standard condensers, 25 standard composite induction coils, 200 standard retardation coils.

LINDSLEY BROTHERS COMPANY, Chicago, reports that it has been making active preparations for taking care of this year's pole business, which, it is expected, will be larger than for many years. The company has been operating three yards in Dickinson county, Michigan, since last September, and has thus far produced a large number of poles of exceptional quality. It expects to be in better position to handle pole orders than at any time in its history. G. L. Lindsley, president, is now devoting his personal attention to the affairs of their Chicago office and expects to remain there the present season.

THE MOON MANUFACTURING COMPANY, Chicago, displayed at the Des Moines, Iowa, convention a junction and splicing box and also a combination terminal head and junction box, which they manufacture. No exhibit received more attention and no apparatus was more fully discussed, it is said, than these appliances, which make it possible to distribute cable either direct or in multiple, without sleeve splices or wipe joints, forming a practical "multiple tap system" with sleeve splices eliminated. A joint formed with a self-soldering nozzle, cut open to obtain a sectional view, was convincing evidence of its reliability.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, New York, reports having closed a contract with the Curtis Publishing Company, of Philadelphia, for a central-energy switchboard equipped with lamp-line signals and double supervisory signals. The board is to be strictly modern in every respect. The Tri-State Telephone Company of Grand Forks, South Dakota, began giving service January 27 with its new exchange equipment furnished by the Stromberg-Carlson company. The company starts out with a good-sized list of subscribers and reports that it is adding to this list rapidly from day to day.

MESSRS. QUEEN & COMPANY, Incorporated, Philadelphia, have published a new circular, No. 904, in which are illustrated the instruments made by them for resistance measurements. This list includes all types of instruments, from a complete Wheatstone bridge and rheostats of the Antony & Kelvin type, to small individual, unmounted resistance coils. Queen & Company's "Acme" and "Decade" sets are described in detail, and considerable space is given to a description of the Queen portable cable testing system. The catalogue is fully illustrated and beautifully gotten up, and should be placed on file by all interested. It can be obtained by written request for same.

THE NATIONAL CONDUIT AND CABLE COMPANY, New York city, in its "Copper Gossip" for March, says: "The market has demonstrated its strength during the past several months, and the demand for all grades of copper has created a movement of extraordinary dimensions. Production and consumption are both exceedingly heavy, but it is believed that the requirements of consumption have been greater lately than the output. Stocks of copper have consequently undergone a substantial reduction compared with those of a year ago. This leaves the statistical situation extremely favorable to the maintenance of market stability." Every telephone man should have "Copper Gossip" sent to him regularly.

THE following announcement has been received: "The partnership between George W. Conover and Edward W. Hammer, doing business under the name of George W. Conover & Company at 1112 Merchants' Loan and Trust Building, Chicago, Illinois, was dissolved on the 31st day of January, 1905. Mr. Hammer has transferred all his interest in said partnership to the said George W. Conover, and withdrawn from said partnership, because of the fact that his other business has occupied so much of his time as to make his withdrawal necessary. The business will be continued under the same name, and at the same location as before, by George W. Conover, who will pay and discharge all debts and liabilities and receive all moneys payable to the said late firm."

THE WHITE CITY ELECTRIC COMPANY, 234 La Salle street, Chicago, has entered the telephone supply field and is making a strong bid for trade. The White City company not only will handle telephone and electrical apparatus and accessories of all kinds for the telephone trade, but will do repairing and installation. It is now completing a new storage battery, especially designed for telephone exchange work, and which it hopes to have ready for the market within the next thirty days. It is also working on a new type of automatic telephone for both exchange and intercommunicating work. Its new style desk stand is pronounced one of the most attractive and most efficient types of this popular instrument ever designed. Frank L. Spitler is at the head of this new concern. He is one of the best known telephone men of the middle west.

THE firm of W. C. Sterling & Son, Monroe, Michigan, dealers in white cedar poles, etc., has been incorporated under the name of W. C. Sterling & Son Company, with a paid-up capital of $100,000 The new firm is composed of W. C. Sterling, president; Walter P. Sterling, vice president; W. C. Sterling, Jr., secretary and treasurer. The main offices and yards will be located at Monroe, Bath City and Omer, the new firm taking over all the cedar pole, tie, hoop and shingle business, including the shingle and tie mill on the Rifle river at Omer. The Bay City and Omer office and yards, as well as all the northern branches of the timber business, will be under the management of W. P. Sterling. The Monroe office, finances, sales and contracts will be managed by W. C. Sterling, Jr., at Monroe. W. C. Sterling and W. C. Sterling, Jr., are also interested in another of the largest cedar firms in Michigan, of which Mr. Sterling is treasurer and his son secretary, with offices and yards at Bay City and other northern points.

IN THE RURAL LINE DISTRICTS

Pat Fogerty is soon to have a telephone.—*Pope Station Pointers in Pana (Ill.) News.*

Waverly is to have a telephone exchange. It don't mean free talk.—*Independence (Mo.) Examiner.*

H. S. Swygman repaired the telephone line last Friday by attaching the broken ends to the barb wire fence. It worked.—*Seafield Sparks in Berne (Ind.) Witness.*

The telephone fad still rages and everybody must now have a telephone whether they have anything else or not.—*West Bloomer Wisps in Carson City (Mich.) Gazette.*

John Ellis is now a stockholder in the Farmers' Telephone line, and any one wishing to talk to John can get him over his own "hello machine."—*Banner Breezes in Canton (Ill.) Leader.*

In last week's items it read that the Providence Telephone Company had put in a "poor" generator. It should have said a "power" generator.—*Providence Provender in Franklin (Ind.) Democrat.*

The past week saw the completion of the telephone line to the residence of Mrs. Piper. Her friends are glad to exchange "Hellos" with her over the line.—*Ennis Echoes in Virginia City (Mont.) Madisonian.*

News has reached here of the marriage of Wilbur Longfellow's sweet little telephone girl at Orange, Texas. Wilbur is now hugging an onion to produce tears.—*Buxton Bubbles in Hillsboro (N. D.) Banner.*

James Crow is one of the directors of the Camden rural telephone exchange, and he's no jay either. When he writes to Attorney-General Bird he uses a canary envelope and an Eagle pencil.—*Adrian (Mich.) Press.*

Babcock, the telephone man, traveled east on the Moose Ear road between Chetek and Charley Strong and found eighteen teams all upset and stuck. "I had to walk back myself, carrying my cutter on my back."—*Chetek (Wis.) Alert.*

Soon as the wire for the new telephone line arrives, Lineman Watts will very soon give us hello connections with a great many nice people that we all desire to exchange greetings with more frequently.—*Guckeen Glints in Blue Earth (Minn.) Post.*

The telephones on the Deer Ridge and Colony line, which we reported last week as on a "strike," are all in good shape again. The cause was some defect in the call bell at central in Deer Ridge, but it has been put in order again.—*Deer Ridge Doings in La Belle (Mo.) Star.*

Information reaches us that T. C. Anderson, our local telephone lineman, will pass from the world of pole climbing and wire fixing and settle down to wedded bliss. Unto whom we may bestow congratulations, as the lucky bride, we have yet to learn, but 'tis certain Mr. Anderson as one of our midst will be greatly missed.—*Blue Earth (Minn.) Post.*

The telephone girls at Shreveport went out on strike Wednesday because three operators were discharged. It took just two hours

for them to bring the haughty corporation to its prayer bones.—*Lake Charles (La.) American.*

Telephone operators have their little episodes to vary the monotony of their work as well as others. Recently one of them sat at the switchboard writing, with open ink bottle and receiver side by

side. A call came in and she hastily grasped the ink bottle and held it to her ear, pouring the ink over herself from shoulder down. It probably gave a suggestion of someone's voice dissolving into liquid murmur.—*Brandon (Minn.) Echo.*

J. O. Golen has lately installed a telephone. All you have to do to have a chat with him is to give one long ring and say, "hello Jasper, is that you?" It matters not how sound asleep he is. He will answer all calls day or night.—*Rose Hill Review in Greenup (Ill.) Press.*

The new telephone line out of town is called the "Farmers' Choice." A cynical old farmer on another line suggested "Must Have It" as a more fitting name, as all the parties on the new line had refused to go on other lines and now had become wild for one.—*Canton (Ill.) Register.*

The Viola telephone exchange is used from ten to fifteen thousand times a year; and yet some people think the operator is not entitled to any pay. It is remarkable how many people there are who want something for nothing.—*Viola Center Vibrations in Audubon (Iowa) Republican.*

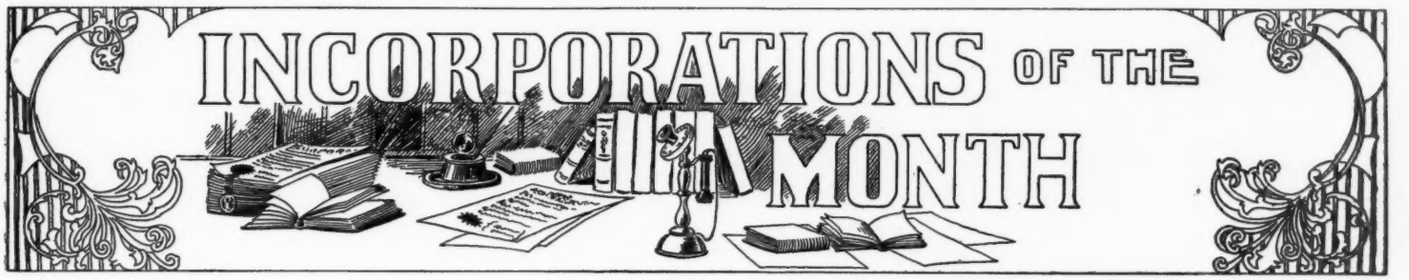
Several more farmers here expect to go into the Mutual Telephone Company soon. Charles Fanson and Jas. Mose were placed on their line last week. The young people are much pleased wherever the telephone exists, and some of the elated are not so young either.—*Beulah Breezes in Pana (Ill.) News.*

The farmers at Bourbon got their dander up because the local telephone company was slow in putting in farm line telephones. They held an indignation meeting and the local telephone company came off the perch and are now building country lines as fast as greased lightning.—*Columbia City (Ind.) Mail.*

The stockholders of the many telephone companies presented their obedient servant, T. F. Demaree, with a new switchboard and general repairs which is a great benefit for the public as well as to Mr. Demaree, who is always ready to accommodate you.—*New Marion Notes in Versailles (Ind.) Republican.*

We understand that two new telephones will come into Mayetta just as soon as the weather opens up, one from the west and one from the south. Your correspondent is thinking pretty strongly of putting one in too, so he can find out the news without traveling around so much.—*Mayetta Musings in Horton (Kan.) Recorder.*

There continues to be considerable telephone activity. One by one the homes are being connected. It might advance the Father's Kingdom on earth if the non-church goers could be connected with the pulpits on the Sabbath days. They might hear the sermons and music in their homes and, perhaps, be led to attend divine service in person after awhile. It might be a good home missionary investment to wire them up without expense to them. Let it be tried.—*Inland Inklings in Hastings (Neb.) Journal.*



ALABAMA.

DECATUR—The Long Distance Telephone and Telegraph Company. Capital stock, $500,000. Chief promoter, E. L. Barber of Wauseon, Ohio.

MONTGOMERY—The Lawrence County Telephone and Telegraph Company. Capital stock, $3,000. Incorporators, F. L. Woodruff, R. L. Quinn, J. D. Andrews, D. L. Carson.

CALIFORNIA.

CHINO—The Home Telephone Company.

CANADA.

FREDERICTON, N. B.—The Richibucto-Rexton Telephone Company. Capital stock, $20,000.

GLASGOW, N. S.—The Union Telephone Company. Capital stock, $5,000. Incorporators, J. McKay, Adam Gunn, A. A. Cameron of East River.

COLORADO.

DENVER—Elk Mountain Mutual Telephone Company. Capital stock, $37,500. Directors, James M. Male, Fred S. Follett, William W. Adair, William M. Hitchens, William H. Dingfield, Charles Blackburn, Patrick Cullen. Steamboat Springs will be the central office.

GEORGIA.

ELKO—The Covania-Elko Telephone Company has organized by electing the following officers: President, W. L. Means; vice-president, T. H. Rentz; treasurer, Dr. J. O. Mann; secretary, J. D. Means.

ILLINOIS.

CAMPUS—The Campus Telephone Company.

AVON—The Union Telephone Company. Capital stock, $2,500. Incorporators, Lucien Gray, John W. Barlow, John T. Culver.

EL PASO—The Grand Telephone Company. Capital stock $2,500. Incorporators: Walter Stottler, C. A. Gull, George S. Patton.

BRUCE—The Bruce Mutual Telephone Company. Capital stock, $2,500. Incorporators, C. C. Luterell, J. M. West, F. E. Bundy.

BONDVILLE—The Bondville Telephone Company. Capital stock $2,500. Incorporators, William H. Scott, George A. Keller, Otis W. Norton.

MAQUON—The Northwestern Farmers' Telephone Company. Capital stock, $1,600. Incorporators, F. J. Walker, F. E. Nelson, F. J. Housh.

AUBURN—The Auburn Telephone Company. President, B. F. Workman; vice-president, F. R. Wheeler; treasurer, S. S. McElvain; secretary, Henry Dawson; manager, W. H. Ramsey.

INDIANA.

CALUMET—The Calumet Telephone Company. Capital stock, $1,000. President, Lewis Head; secretary, George Shafer.

GREENTOWN—The Greentown Telephone Company. Capital stock, $30,000. J. M. Glenn, W. L. Bott, A. A. Largent, incorporators.

CRESTON—The Northwestern Telephone Company. Capital stock, $10,000. Incorporators, A. G. Taylor, C. J. Thompson, A. E. Vinnedge.

BATTLE GROUND—The Battle Ground Telephone Company. Capital stock, $1,500. Incorporators, Edward Towers, Wm. J. Walters, Thomas D. Chenoweth.

FORT RITNER—The Fort Ritner Telephone Company. Capital stock, $486. Directors, E. Wicker, W. A. Holland, Thomas Fields, L. G. Boyd, E. B. Dixon.

BORDEN—The Farmers' Union Telephone Company. Capital stock $1,000. Directors, James H. Miller, Charles M. Collins, Henry McKinley. The company will establish an exchange at Borden.

WEST TERRE HAUTE—The Farmers' and Merchants Mutual Telephone Company. Capital stock, $5,000. Directors, W. F. Tippin, James H. Davis, M. T. Goodman, John E. Gamron, Edgar Philabaum.

INDIANAPOLIS—The Farmers' Union Telephone Company of Clark County. Capital stock, $1,000. Incorporators, James H. Miller, Charles M. Collins, Henry McEmsley, Lewis C. Johnson, A. C. Fordyce, B. F. Brown, Dennis McKinley.

INDIANAPOLIS—The Sanford Mutual Telephone Company of Vigo, Parke, Vermillion and Starke Counties. Capital stock, $5,000. Directors, J. W. Wolfe, C. A. Ray, Welton Smith, William J. Tritt, Bert Evinger, John M. Art, Bert Davidson, Arista Houston, J. E. Mahan, James Shew.

IOWA.

EXLINE—The Exline Mutual Telephone Company.

RIDGWAY—The Lincoln Telephone Company. Capital stock, $9,600.

SCRANTON—The Scranton Independent Mutual Telephone Company. Capital stock, $5,000.

SOMERS—The Somers Telephone Company. Capital stock $5,000. Incorporators, J. Mills and others.

SOMERS—Somers Telephone Company Capital stock, $5,000. Incorporators, J. W. Mills and others.

EXLINE—The Mutual Telephone Company. Capital stock $2,000. Incorporators: H. W. Farnsworth and others.

ATLANTIC—The Atlantic Mutual Telephone Company. Incorporators, W. Lamb, A. Pelley, D. E. Milford and others.

GOWRIE—The Lena-Gowrie Mutual Telephone Company. Capital stock, $15,000. Incorporators, A. S. Walline and others.

FARNHAMVILLE—The Farnhamville Mutual Telephone Company. Capital stock $10,000. Incorporators: Chas. Rose and others.

BRONSON—A new telephone company has been organized at this place with M. G. Smith, president, and F. H. Oertel, secretary.

PLAINFIELD—The Bremer & Butler Mutual Telephone Company Capital stock $10,000. President, Chas. Colburn; secretary, William Suram.

BRONSON—The Bronson Telephone Company. Capital stock, $5,000. Incorporators, M. G. Smith, H. H. Onstot, D. D. Saw, George W. Elliott..

CHARLES CITY—Farmers' Mutual Telephone Company. Capital stock, $20,000. Incorporators, M. A. Hirsch, J. D. Vornes, B. E. Hand, F. T. Stromberg, William Braend.

PARMA—The Parma Telephone Company, Limited. Capital stock, $10,000. Incorporators, C. C. Paine, S. G. Tuning, W. F. Howard, E. H. Brumback, F. E. Fisk, all of Parma.

RAKE—A telephone company has been organized at this place with the following officers: President, Thore Sundum; vice-president, Ole Ryg; secretary, Adolph Miller; treasurer, L. K. Bolstad; directors, G. S. Jacobson, Nels Skogen, Absolom Havnen. A line will be built from Rake to Amund.

SIOUX CITY—The New State Telephone Company. Capital stock, $1,000,000. President, Charles G. Cockerell, Jefferson; first vice-president, W. H. Leathers, Mapleton; second vice-president, Joseph Mattes, Odebolt; secretary, T. B. Lutz, Mapleton; treasurer, M. M. Head, Jefferson. Incorporators and board of directors, the above officers and Ira Conger of Cherokee; J. C. Hammond of Mapleton.

KANSAS.

MAYFIELD—Chikaskia Telephone Company. Capital stock $5,000.

PRESTON—Preston Plain Telephone Company. Capital stock $5,000.

MINNEAPOLIS—The Rural Telephone Company. Capital stock, $6,000.

IUKA—The Farmers' Union Telephone Company. Capital stock, $8,000.

BROWNELL—The Pleasant Plain Telephone Company. Capital stock, $1,000.

IONIA—The Limestone Farmers' Telephone Company. Capital stock, $5,000.

HIAWATHA—The Hiawatha Mutual Telephone Company. Capital stock $10,000.

PAWNEE CITY—The Farmers' & Merchants' Telephone Company. Capital stock $5,000.

KENTUCKY.

JEFFERSONTOWN—New Home Rural Telephone Company. Capital stock, $270.

FRANKFORT—The Snyder Telephone Company of Spencer County. Capital stock $2,000.

MAINE.

AUGUSTA—The Lorimer Automatic Telephone Company. Capital stock, $10,000,000. President, G. R. Hadlock, Augusta; treasurer, E. F. Whittum, Augusta.

AMHERST—The Union River Telephone Company. Capital stock $8,000. President, A. E. Mace; treasurer, H. T. Silsby; directors, above officers and J. S. Patten.

APPLETON—West Appleton Telephone Company. Capital stock, $10,000. President, A. Millett, Searsmont, Me.; treasurer and clerk, C. R. Bartlett, Appleton, Me.

FARMINGTON—The Franklin Farmers' Co-operative Telephone Company has been organized at this place with a capital stock of $10,000. President, Henry H. Rice; treasurer, F. E. Voter.

BETHEL—The Central Intervale Telephone Company. Capital stock $1,000. President, O. A. Buch; treasurer, C. C. Bryant; directors, above officers and B. W. Kimball; C. L. Sanborn, C. C. Eames.

PORTLAND—The Mexican Telephone and Telegraph Company organized. Capital stock, $10,000. Promoters, Charles Hall Adams of Boston, president and treasurer; Henry C. Houston, Philip J. Larrabee, Frank P. Larrabee, Charles J. Clement, Portland.

MARYLAND.

DENTON—The Farmers' and Merchants' Telephone Company of Caroline county. Incorporators, Rev. George S. Raingh, Levy R. Brumbaugh, Joshua Y. King, David E. King, Clement Drake, Robert E. Smith of Ridgely and Harry M. Thompson of Hillsboro.

MICHIGAN.

BUTLER—The Quaker Line Telephone Company has been organized with the following officers: President, Roy Raymond; vice-president, S. B. Ransom; secretary, Leroy Eldred; treasurer, D. McCone.

WATSON—The Watson Telephone Company recently organized has elected the following officers: President, Thomas Young; secretary and treasurer, C. W. Hoke; executive committee, Frank Miller, Aaron Treece, F. C. McClelland.

MINNESOTA.

TORAH—The Torah Telephone & Improvement Company.

BIG LAKE—A rural telephone company has been organized at this place and $1,500 in stock subscribed.

READING—The Farmers' Mutual Telephone Company. Capital stock, $25,000. Incorporators, Fred Baker, J. Hurr, R. J. Jones.

MAPLE LAKE—The Maple Lake Telephone Company. Capital stock, $10,000. Incorporators, A. W. May, A. J. Phillips, J. O. Perkins.

MORA—The Farmers' Springbrook Telephone Company has been organized with officers as follows: President, J. C. F. Long; secretary, Howard Aldrich.

BEARDSLEY—The Gopher State Telephone Company. Capital stock $50,000. Officers, A. S. Stephens, C. W. Wheeler, John Minkiewitz, Jr., L. G. Westfall.

MINNEAPOLIS—The Farmers' Mutual Telephone Company of Nobles County. Capital stock, $20,000. President, Frank Baker; vice-president, J. Burr Ludlow; treasurer, R. J. Jones.

FARIBAULT—The Rice County Rural Telephone Company. Capital stock, $100,000. Incorporators, A. G. Chase, Katherine G. Chase, Isabella G. Chase, W. T. Mollison, Cora B. Mollison, all of Faribault.

BRAINERD—The Brainerd Telephone Exchange Company. Capital stock, $50,000. Incorporators, C. A. Walker, Werner Henstead, F. H. Cruenbagen, H. P. Dunn, Mons Mahlam, H. D. Treglawny.

LAKE CITY—The Dwelle Telephone Company. Capital stock, $100,000. The officers of the company are as follows: President, G. Dwelle; vice-president, G. William Patton; secretary and treasurer, Glen M. Dwelle.

NEW ULM—The New Ulm Rural Telephone Company. Capital stock $50,000. President, Philip Liesch, New Ulm; vice-president, Alex. Russell, West Newton; secretary, A. J. Vogel, New Ulm; treasurer, Otto Schell, New Ulm.

HECTOR—The Hector Telephone Exchange. Capital stock, $25,000. Incorporators, Emil Larson, Edwin Dahlgren, Justin Johnson, E. M. Erickson, of Palmyra; Harry L. D'Anus, Henry I. Forbenson, George S. Eichmiller, Hector.

BENSON—The DeGraff & Louriston Telephone Company has been organized at this place with the following officers: President, Mike McCann; vice-president, P. W. Brenahan; treasurer, F. P. McCauley; secretary, Thos. F. Ward; trustees, E. D. Hicks, Thos. McCann, J. H. Ferry.

MISSISSIPPI.

MERIDIAN—The Meridian Home Telephone Company. Capital stock $250,000. Incorporators, I. L. Wetsel, F. E. Gressett, W. N. Ethridge, S. A. Jones, C. B. Lusk and others.

NEW YORK.

LYONS—The Savannah Telephone Company. Capital stock $4,000.

WATERVILLE—The Waterville Telephone Company. Capital stock, $25,000. Directors, Ira D. Branard, M. W. Terry, Samuel W. Goodwin, Rochester.

WORCESTER—The Worcester Telephone Company. Capital stock, $1,000. Incorporators, Jas. Nelson, Guy Coats, S. Shafer.

WORCESTER—The Worcester Telephone Company. Capital stock, $1,000. Directors, M. J. Preston, O. J. Parker, Worcester; Irving Mowers, Decatur.

ALBANY—Robinson Telephone Company. Capital stock, $10,000. Directors, T. J. Robinson, Potsdam; W. F. Robinson, Addison, Vt.; Lindley Robinson, Crary's Mills.

PORT BYRON—The Port Byron Telephone Company. Capital stock, $50,000. Directors, A. P. Cole, F. A. Mead, F. S. Root, John W. Munroe, H. R. Warren, T. M. Crane, Port Byron; Z. W. Sayer, Montezuma.

CLINTON—The Clinton Home Telephone Company. Capital stock $25,000. Directors: Cory D. Hayes, G. T. Caldwell, H. S. Powell, M. S. Powell, all of Clinton; C. H. Poole, T. H. Ferris of Utica; G. R. Fuller, Rochester.

NEBRASKA.

BOSTWICK—The Republican Valley Telephone Company.

ALVO—The Alvo Telephone Company. Capital stock, $3,000.

STAPLEHURST—Staplehurst Telephone Company. Capital stock, $5,000.

BRUNING—The Home Telephone Company. Capital stock, $5,000. Incorporators, C. M. McNeil and others.

UPLAND—The Upland Telephone Company. Capital stock $5,000. Incorporators, Geo. Hansen, C. W. Fisk and others.

KEARNEY—Kearney Telephone Company. Capital stock $100,000. Incorporators, F. H. Gilcrest, J. W. Harris, W. J. Stadelman.

NEW JERSEY.

NEWARK—At a recent meeting of the Newark Independent Telephone Company it was decided to increase the capital stock to $150,000.

WILMINGTON—The Wilmington-Southport Telephone & Telegraph Company. Capital stock $5,000. Incorporators, W. I. Watson, L. J. Pepper, Richard Dosher and others.

NEWARK—The Citizens' Union Telephone Company. Capital stock, $150,000. Incorporators, Leslie Park, Red Bank; Edgar W. Danner, New York; Henry C. Beach, Newark.

NORTH CAROLINA.

ALBEMARLE—The Lucas Telephone Company. Capital stock, $10,000. Incorporators, E. Love, J. D. Love and others.

HIGH POINT—The North State Telephone Company. Capital stock, $20,000. President, W. H. Ragan; vice-president, J. P. Redding; secretary and treasurer, E. D. Steele; manager, J. F. Hayden.

OHIO.

ST. CLAIRSVILLE—Richland Telephone Company. Capital stock, $4,000. Incorporators, W. Wiley, J. T. Knox, A. A. Hartley, R. J. Johnson, H. C. Ault.

EAST PALESTINE—The Unity Telephone Company. Capital stock, $5,000. Incorporators, J. F. Johnston, N. W. Dyer, J. J. Rukendrod, E. L. Lyon, J. Skerbawl.

MT. EPHRAIM—The Coens Telephone Company. Capital stock $500. Incorporators, H. E. Riggs, J. A. Luper, J. A. Rich, William Miley, Frank Miley and others.

OTTAWA—The Boomerline Mutual Telephone Company. Incorporators, A. J. Hermiller, R. T. Meyer, H. M. Kohls, James Agnes, G. Redd, C. O. Punnan, Jerome Kohls.

ELMORE—The East Wood Telephone Company. Capital stock, $50,000. Incorporators, J. G. Steinkamp, Homer Metzger, Taylor Fuller, Fred Windisch, G. W. Luckey.

UNION FURNACE—The Pioneer Telephone Company. Capital stock $2,000. Incorporators, A. F. Woodward, E. W. Sanner, D. A. Frey, W. J. Bethel, E. R. Woodward.

WINDHAM—Windham Telephone Company. Capital stock, $10,000. Incorporators, C. A. Randall, E. W. Walcutt, J. W. Shank, H. T. Sheldon, D. B. Wagner, E. A. Lehman

RIVER STYX—The Medina County Farmers' Telephone Company. Capital stock, $12,000. Incorporators, E. R. Culver, H. F. Rickert, C. C. Kindig, D. J. Eddy, J. C. Fixler, C. B. Lowe.

COLUMBUS—The Wayne Telephone Company of Ashtabula County. Capital stock, $6,000. Incorporators, S. A. Babcock, R. P. Miner, A. C. Bogue, D. L. Ketcham, William Dolan, R. Dillon, O. K. Ketcham.

MESOPOTAMIA—The Mesopotamia Telephone Company has been organized at this place with the following officers: President, H. J. Wilcox; vice-president, T. W. Kingdom; secretary, Jerry Seeley, treasurer, Warren Bates.

NEW KNOXVILLE—The New Knoxville Telephone Company. Capital stock, $8,750. President, A. H. Stienecker; vice-president, E. H. Meckstroth; secretary and treasurer, G. W. Holl; directors, A. H. Stienecker, Wm. Haberkamp, G. W. Holl, George Wellman, C. A. Meckstroth.